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International Space Station ISS In-Flight Maint/Struct and Mech Book

ISS-Expedition 1

Mission Operations Directorate
Operations Division

Preliminary
March 11, 1998

These procedures are available electronically on the SODF Homepage at http://fltproc.jsc.nasa.gov

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

United Space Alliance

INTERNATIONAL SPACE STATION
ISS IN-FLIGHT MAINT/STRUCT AND MECH BOOK
ISS-EXPEDITION 1

PRELIMINARY
March 11, 1998

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This document is not currently under the configuration control of the Systems Operations Data File Control Board (SODFCB). During the interim, changes may be submitted to the book manager.

ACKNOWLEDGEMENTS

Editorial Standards Review	Paul Hart Donald Henry Shari Odom
Electronic File Preparation	Tammy Walker

CONTENTS

The SODF procedures listed here are for the use of the Expedition 1 crew. By final publication, all applicable Increment 1 procedures will be included in this list. The current list of procedures is for use from 2R docking to 5A docking based on Rev C Assembly Sequence.

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ISS IFM PROCEDURES

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CBM CONTROLLER ASSEMBLY R&R NODE 1

OBJECTIVE:
This procedure removes and replaces a failed Node 1 CBM Controller Assembly.

LOCATION:
Installed: Active CBM docking ring
Stowed: √Maintenance Database

DURATION:
25 minutes

PARTS:
CBM Controller Assembly (P/N 2355260-1)

MATERIALS:
None

TOOLS REQUIRED:
Equipment Bag
Tether
Scopemeter
Kit E:
    Ratchet 3/8” Drive
    4” Ext 3/8” Drive
Kit C:
    7/16” Socket, 3/8” Drive
Kit D:
    5/32” Hex Head, 3/8” Drive
Kit G:
    (30-200 in-lbs)Trq Wrench, 3/8” Drive
IVA Tool Box, Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
FWD CBM CPA CHECKOUT NODE 1

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

Table 1. Node 1 CBM Controller Power Distribution

Cntr Assy	Pri Pwr RPC	Sec Pwr RPC
FORWARD	--------	--------
Cntr Asy 1	RPCM_N13B_C_RPC_03	RPCM_N14B_A_RPC_02
Cntr Asy 2	RPCM_N13B_C_RPC_04	RPCM_N14B_A_RPC_03
Cntr Asy 3	RPCM_N13B_C_RPC_05	RPCM_N14B_A_RPC_14
Cntr Asy 4	RPCM_N13B_C_RPC_06	RPCM_N14B_A_RPC_15
ZENITH	--------	--------
Cntr Asy 1	RPCM_N13B_B_RPC_11	RPCM_N14B_B_RPC_03
Cntr Asy 2	RPCM_N13B_B_RPC_12	RPCM_N14B_B_RPC_04
Cntr Asy 3	RPCM_N13B_B_RPC_13	RPCM_N14B_B_RPC_05
Cntr Asy 4	RPCM_N13B_B_RPC_14	RPCM_N14B_B_RPC_06
NADIR	--------	--------
Cntr Asy 1	RPCM_N13B_B_RPC_03	RPCM_N14B_B_RPC_11
Cntr Asy 2	RPCM_N13B_B_RPC_04	RPCM_N14B_B_RPC_12
Cntr Asy 3	RPCM_N13B_B_RPC_05	RPCM_N14B_B_RPC_13
Cntr Asy 4	RPCM_N13B_B_RPC_06	RPCM_N14B_B_RPC_14
PORT	--------	--------
Cntr Asy 1	RPCM_N1RS2_C_RPC_07	RPCM_N1RS1_B_RPC_05
Cntr Asy 2	RPCM_N1RS2_C_RPC_08	RPCM_N1RS1_B_RPC_06
Cntr Asy 3	RPCM_N1RS2_C_RPC_10	RPCM_N1RS1_B_RPC_13
Cntr Asy 4	RPCM_N1RS2_C_RPC_11	RPCM_N1RS1_B_RPC_14
STARBOARD	--------	--------
Cntr Asy 1	RPCM_N1RS2_A_RPC_05	RPCM_N1RS1_C_RPC_05
Cntr Asy 2	RPCM_N1RS2_A_RPC_06	RPCM_N1RS1_C_RPC_06
Cntr Asy 3	RPCM_N1RS2_A_RPC_10	RPCM_N1RS1_C_RPC_12
Cntr Asy 4	RPCM_N1RS2_A_RPC_11	RPCM_N1RS1_C_RPC_13

1. Verify Primary, Secondary RPCs supplying applicable CBM are Op.

PCS S&M

N1 [X] CBM Display [X] = Fwd, Zenith, Nadir, Port, Starboard

'Controller Panel Assy Power/Data Status'

√Pri Pwr RPC Contr Assy [Y] = Op [Y] = 1 2 3 4

See Table 1.

√Sec Pwr RPC Contr Assy [Y] = Op [Y] = 1 2 3 4

See Table 1.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

2. Don static wrist tether. Secure clip end to unpainted metal surface.

REMOVE

See Figure 1.

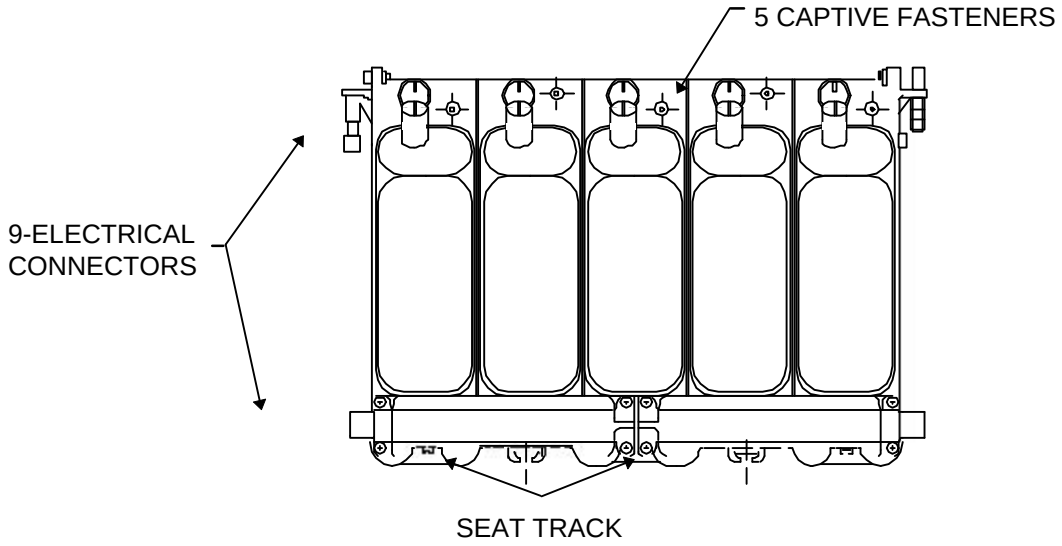


Figure 1.- CBM Controller Panel Assembly.

3. Label power/data cables with corresponding J receptacle numbers.

4. Demate power/data cable connectors (nine) from Controller Assembly. Temporary restrain.

5. Disconnect ground straps (two) from Controller Assembly (Ratchet 3/8" Drive, 4" Ext, 5/32" Hex Head).

6. Loosen fasteners (five), detach from bulkhead (Ratchet 3/8" Drive, 7/16" socket). Label, temporary stow.

REPLACE

7. Tighten fasteners (five), torque to 100 ± 5 in-lbs (Ratchet 3/8" Drive, 7/16" Socket, (30-200 in-lbs)Trq Wrench).

8. Connect Controller Assembly ground straps (two) (Ratchet 3/8" Drive, 4" Ext, 5/32" Hex Head).

9. Check for continuity between casing of each Controller Assembly module (seven) and Node 1 structure (Scopemeter).

Table 2. CBM Controller Power/Data Cables

Cable	Plug No.	Receptacle No.	Harness No.
Capture Latch	P1	J5	
Powered Bolt	P1	J6	
Powered Bolt	P1	J7	
Powered Bolt	P1	J8	
Powered Bolt	P1	J9	
Primary Power	P2	J1	
Secondary Power	P1	J3	
1553 Bus Data	P2	J2	
485 Bus Data	P1	J4	

10. Mate all CBM controller power/data cables (nine). See Table 1.

CHECK OUT

11. For applicable controller, perform FWD CBM CPA CHECKOUT NODE 1, all (SODF: S&M), then

POST MAINTENANCE

12. Stow failed controller assembly, tools, equipment.

13. Update Maintenance Database.

CBM POWERED BOLT - NUT ASSEMBLY R&R GENERIC

OBJECTIVE:
This procedure removes and replaces a defective CBM Powered Bolt - Nut Assembly.

LOCATION:
Installed: Passive CBM docking ring
Stowed: √Maintenance Database

DURATION:
TBD

PARTS:
CBM Powered Bolt - Nut Assembly (P/N 683-13503-001)

MATERIALS:
None

TOOLS REQUIRED:
Equipment Bag
Tether
Kit E:
- Ratchet 3/8” Drive
- Ratchet 1/4” Drive
- 2” Ext 1/4” Drive

Kit F:
- 5/16” Socket, 1/4” Drive

Kit C:
- 3/8” Socket, 3/8” Drive

REFERENCED PROCEDURE(S):
FWD CBM CPA CHECKOUT NODE 1

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

1. √CBM Controller Pwr - Off

ACCESS

2. If required, remove, temporary stow vestibule closeout for access by unfastening 1/4 turn fasteners.

3. If required, remove, temporary stow PCBM alignment guides for access by loosening fasteners (five per alignment guide) (Ratchet 3/8” Drive, 3/8” Socket).

REMOVE

4. Loosen fasteners (two) on nut plate (Ratchet 1/4” Drive, 2” Ext, 5/16” Socket).

5. Grasp end of failed nut assembly, pulling back and away from passive berthing ring.
   Label, temporary stow assembly.

REPLACE

NOTE

Two alignment pins on nut plate and two alignment holes on inside of passive berthing ring will assist in providing proper alignment during assembly.

6. Align alignment pins (two) on nut plate with alignment holes (two) in passive berthing ring.

7. Slide assembly into alignment holes until there is metal to metal contact.

8. Tighten fasteners (two) 1/4 turn past snug (Ratchet 1/4” Drive, 2” Ext, 5/16” Socket).

CHECK OUT

NOTE

Prior to reinstallation of alignment guide(s) or closeouts, operation of powered bolt assembly must be verified by complete engagement of powered bolt into nut assembly.

9. Perform FWD CBM CPA CHECKOUT NODE 1, all (SODF: S&M) then,

CLOSE OUT

NOTE
There are four alignment pins on alignment guide and four alignment pin sockets on PCBM ring to aid guide installation.

10. If PCBM alignment guides were removed, replace alignment guides by rotating fasteners (five) 1/4 turn past snug (Ratchet 3/8” Drive, 3/8” Socket).

11. If vestibule closeout was removed for maintenance, install vestibule closeout by fastening 1/4 turn fasteners.

POST MAINTENANCE

12. Stow defective power bolt nut assembly, tools, maintenance supplies.

13. Update Maintenance Database.

CBM POWERED BOLT R&R GENERIC

OBJECTIVE:
This procedure removes and replaces a failed CBM Powered Bolt.

LOCATION:
Installed: Active CBM docking ring
Stowed: √Maintenance Database

DURATION:
40 minutes (55 minutes if powered bolt is jammed in nut assembly)

PARTS:
CBM Powered Bolt (P/N 683-13450-001)
CBM Powered Bolt - Nut Assembly (P/N 683-13503-001) (only required if bolt is jammed in nut)

MATERIALS:
None

TOOLS REQUIRED:
Equipment Bag
Tether
Scopemeter
Kit E:
- Ratchet 3/8” Drive
- Ratchet 1/4” Drive
- 2” Ext 1/4” Drive
- 3/8” to 1/4” Adapter

Kit G:
- 30-200 in-lbs Trq Wrench, 3/8” Drive

Kit F:
- 5/16” Socket, 1/4” Drive

Kit C:
- 3/8” Socket, 3/8” Drive

Kit A:
- 1-5/16” Combination Wrench

Powered Bolt Tool Kit:
- Spanner Wrench

Kit N:
- 1/4” x 5/16” Ratcheting Box Wrench
- #10 Trq Bit

Kit J:
- Large Needle Nose Pliers

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

1. √CBM Controller Pwr - Off

ACCESS

2. If required, remove, temporary stow vestibule closeout for access by unfastening 1/4 turn fasteners.

3. If required, remove, temporary stow ACBM alignment guides for access by loosening fasteners (five per alignment guide) (Ratchet 3/8” Drive, 3/8” Socket).

REMOVE

4. Demate power connector P2 from bolt actuator power receptacle J1.

5. If required for access, remove harness from RTL actuator power receptacle.

6. Demate powered bolt load cell sensor cable from connector bracket (connector P3).

NOTE

Spanner Wrench is labeled to identify correct threaded collar removal (OFF) and installation (ON) orientation. See Figure 1.

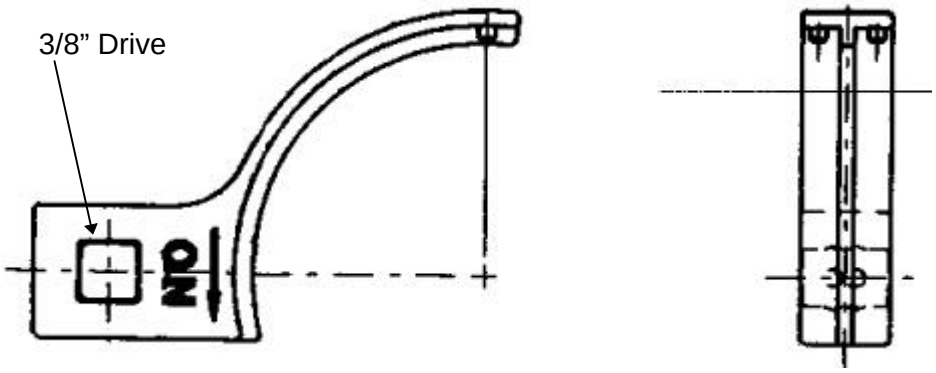


Figure 1.- Spanner Wrench for Actuator Collar.

7. Break torque on threaded collar by inserting spanner wrench pin into one of holes on threaded collar (Ratchet 3/8” Drive, Spanner Wrench).

8. Turn threaded collar approximately five turns (until collar is loose).

9. Remove, temporary stow powered bolt actuator from powered bolt.

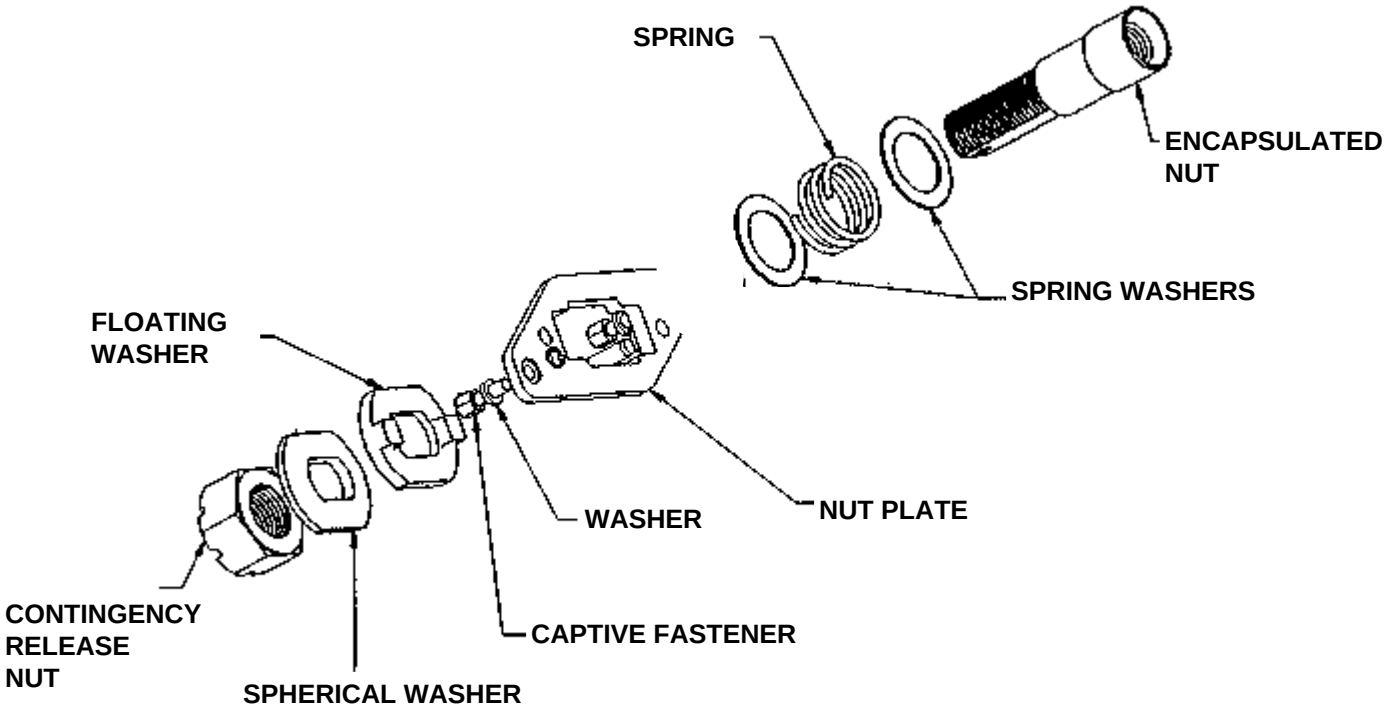


Figure 2.- Powered Bolt Nut Assembly.

10. If required for access, remove connector brackets (1/4” x 5/16” Ratcheting Box Wrench, #10 Trq Bit). Temporary stow bracket.

11. If Powered Bolt is jammed in encapsulated nut
    Remove powered bolt nut assembly contingency release nut (steps 12 through 18). See Figure 2.

    If Powered Bolt not jammed in encapsulated nut
    Go to step 19.

12. If required, remove, temporary stow PCBM alignment guides for access by loosening fasteners (five per alignment guide) (Ratchet 3/8” Drive, 3/8” Socket).

13. Remove, temporary stow cotter pin from end of powered bolt nut assembly (Needle Nose Pliers).

14. Remove, temporary stow contingency release nut and washers (two) from powered bolt nut assembly (1-5/16” Combination Wrench).

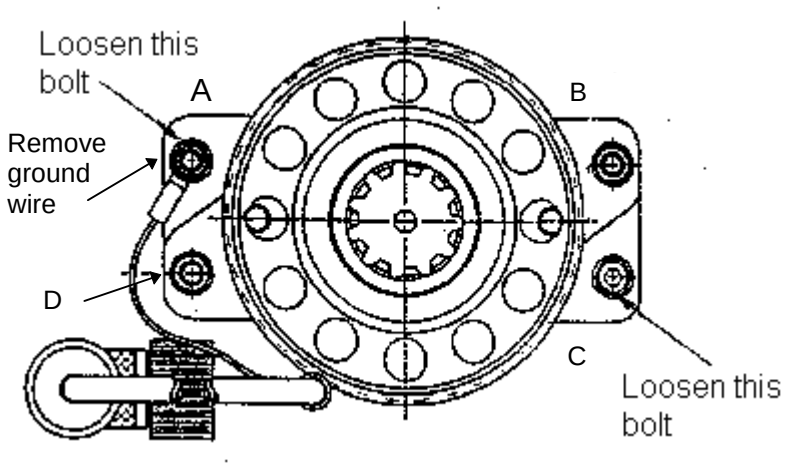


Figure 3.- Powered Bolt - Top View (with Actuator Removed).

NOTE

In steps 15 or 16, loose items may be freed (spring, two washers). See Figure 2. In step 15, ground wire will be released when bolt A is loosened. Note orientation of wire so that it may be reinstalled in a similar manner on spare powered bolt. See Figure 3.

15. Remove, temporary stow powered bolt, encapsulated nut, from ACBM by loosening hex head fasteners (two) (Ratchet 1/4" Drive, 2" Ext, 5/16" Socket). See Figure 3.

16. Remove powered bolt nut plate by loosening captive fasteners (two) (Ratchet 1/4" Drive, 2" Ext, 5/16" Socket).
    Temporary stow Nut Plate and loose assembly items.

NOTE

Two alignment pins on spare powered bolt nut assembly should mate with corresponding sockets on PCBM docking ring.

17. Install powered bolt nut assembly on PCBM ring, snug fasteners (two) (Ratchet 1/4" Drive, 2" Ext, 5/16" Socket).

NOTE

Four pins on PCBM alignment guide should mate with corresponding sockets on PCBM docking ring.

18. If PCBM alignment guides were removed, reinstall by rotating fasteners (five), 1/4 turn past snug (Ratchet 3/8" Drive, 3/8" Socket).
    Go to step 20.

19. Remove powered bolt from ACBM by loosening fasteners (two) (Ratchet 1/4” Drive, 2” Ext, 5/16” Socket, 1/4” Drive).
Label, temporary stow. See Figure 3.

REPLACE

NOTE
Two alignment pins on bottom side of powered bolt mounting plate should mate with corresponding pin sockets on ACBM docking ring.

20. Insert bottom of powered bolt into recessed hole in ACBM ring.

21. Slide powered bolt into alignment holes until metal to metal contact is felt.

22. Slide lug on ground cable under washer of fastener A or C. See Figure 3.

23. Rotate fasteners (two), 1/4 turn past snug (Ratchet 1/4” Drive, 5/16” Socket), torque to 43 --- 48 in-lb ((30-200 in-lbs) Trq Wrench, 3/8” to 1/4” Adapter, 2” Ext, 5/16” Socket).

24. Check for continuity between casing of powered bolt actuator and ACBM ring structure.

NOTE
Final alignment of actuator should be such that power/data receptacle on actuator is pointed in inboard direction.

25. Mate output gear of powered bolt actuator to input gear of powered bolt.

26. Rotate actuator while pressing it against powered bolt until actuator pins seat in corresponding holes in powered bolt.

27. Turn threaded collar on actuator 1/2 turn past snug, torque to 145 $\pm$ 15 in-lbs (Spanner Wrench, Ratchet 3/8” Drive, (30-200 in-lbs)Trq Wrench).

28. Mate power connector P2 to bolt actuator power receptacle J1.

29. Mate powered bolt load cell sensor cable to connector bracket (connector P3).

CLOSE OUT

NOTE
Four pins on PCBM alignment guide should mate with corresponding sockets on ACBM docking ring.

30. If ACBM alignment guides were removed for maintenance, replace alignment guides by rotating fasteners (five) 1/4 turn past snug (Ratchet 3/8” Drive, 3/8” Socket).

31. If vestibule close out was removed for maintenance, install vestibule closeout by fastening 1/4 turn fasteners.

POST MAINTENANCE

32. Stow failed powered bolt, failed powered bolt-nut assembly (if applicable), tools, equipment.

33. Update Maintenance Database.

HATCH R&R

OBJECTIVE:
Remove and replace a defective Hatch.

LOCATION:
Installed: U.S. Common Hatch
Stowed: √Maintenance Database

DURATION:
110 minutes

TOOLS REQUIRED:
IVA Tool Box Left Lid:
- Plastic Feeler Gauges
- Magnifying Glass (7X)

Kit A:
- 11/16” Combination Wrench
- 11/16” Crowfoot, 3/8” Drive

Kit D:
- 5/16” Hex Head, 3/8” Drive

Kit E:
- Ratchet 3/8” Drive
- Driver Handle 3/8” Drive
- (30-200 in-lbs)Trq Wrench, 3/8” Drive

Kit F:
- 1/8” Hex Head Driver, 3/8” Drive

REFERENCED PROCEDURE(S):
None

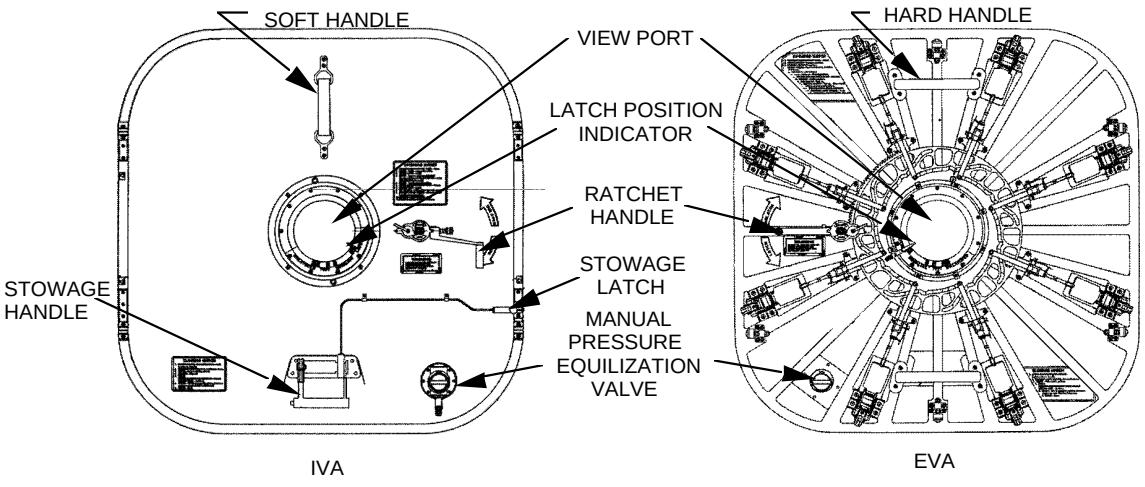


Figure 1.- Hatch Dome/Rib.

REMOVE

1. Translate to rib side of Hatch.

2. Close Hatch, turn crank handle until pointer is at the EQUALIZE position.

3. Loosen hatch latch set screws (eight) one full turn (Driver Handle 3/8" Drive, 1/8" Hex Head).

4. Open Hatch.

5. Translate to dome side of Hatch.

6. Close and latch Hatch.

NOTE
Six quick release pins are released from each radial track to allow for rotation. Four quick release pins are released from each axial track to allow for rotation.

7. Release disconnect grounding cables connecting tracks to bulkhead by using quick disconnect feature.

8. Release tethered quick release pins from Hatch track, rotate track out of way. Temporary stow.

CAUTION
Two crewmembers are required to translate Hatch from stowed location.

9. Unlatch Hatch.

10. Remove Hatch from bulkhead.

REPLACE

11. Orient replacement Hatch so that up arrow on soft handle assembly, located on dome side of Hatch, points in same direction the Hatch will travel up the tracks. Three arrow decals, also on dome side of Hatch, near rollers match three arrow decals on bulkhead.

12. Position and align replacement Hatch on bulkhead using alignment guides as visual cues to center Hatch on bulkhead.

13. Latch Hatch.

14. Release hatch tracks from temporary restrained position.

15. Rotate tracks onto hatch rollers, into installed position.

16. Install quick release pins into track.

17. Reconnect grounding cables on bulkhead to track.

18. For out-of-tolerance guides, loosen jamnuts A and D completely (11/16" Combination Wrench, Ratchet 3/8" Drive, 11/16" Crowfoot).

19. Turn jamnuts B and C manually to set alignment guide to bulkhead gap at 0.020 to 0.025 inches (Feeler Gauge).

20. Hold jamnut C stationary with combination wrench while torquing D against C to 260 ± 20 in-lbs (11/16" Combination Wrench, 11/16" Crowfoot, (30-200 in-lbs) Trq Wrench).

21. Hold jamnut B stationary with combination wrench while torquing jamnut A against B to 260 ± 20 in-lbs (11/16" Combination Wrench, 11/16" Crowfoot, (30-200 in-lbs) Trq Wrench).

22. Check alignment guide-to-bulkhead gap.
    If gap is within tolerance, continue with procedure.
    |
    If gap is not within tolerance, repeat alignment guide adjustment.

23. Loosen set screws (two) on roller assembly (Ratchet 3/8" Drive, 5/16" Hex Head).

24. Push track away from roller to take up slack while sliding head of roller to achieve .010 to .020 gap between roller and track (Feeler Gauges).

25. Snug set screws (two) on roller assembly, torque set screws (two) on roller assembly, torque to 71 ± 5 in-lbs (5/16" Hex Head, (30-200 in-lbs) Trq Wrench).

26. Open and close Hatch several times to verify proper travel in tracks.
    If Hatch opens without binding, continue with procedure.
    |
    If Hatch binds when opening, repeat hatch roller assembly adjustment.

27. Mark, tape approximate location of latches on dome side of Hatch.

28. Close and latch Hatch.

NOTE
Gap between hatch plate and hatch seal metal substrate should be .015 to .025 inches at each location. Gap at the corners of Hatch should be .030 to .035 inches.

29. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) (0.015 to 0.025) and hatch corners (four) (0.030 to 0.035) (Feeler Gauge).

    If locations are out of tolerance, continue with procedure.

    If locations are within tolerance, go to step TBD of this procedure.

30. Open Hatch.

31. Translate to Rib side of Hatch.

32. Close Hatch.

33. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) and hatch corners (four) (Feeler Gauge).
    If locations are out of tolerance

    Repeat adjust latch procedure until all latch locations (eight) have gap between 0.015 to 0.025 inches and all hatch corners (four) have gap between 0.030 to 0.035 inches.

    If locations are within tolerance, continue procedure.

34. Open Hatch.

35. Visually inspect Hatch seals with 7X magnifying glass for nicks, burrs, cuts, gouges, etc. that would impair proper seal.

36. Verify seal integrity by performing HATCH SEAL LEAK TEST.

POST MAINTENANCE

37. Stow Hatch, tools, and equipment.

38. Update Maintenance Database.

HATCH INNER WINDOW ASSEMBLY R&R

OBJECTIVE:
Remove and replace Hatch Inner Window Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance Database

DURATION:
20 minutes

PARTS:
Hatch Inner Window Assembly (P/N 683-13076-1)

MATERIALS:
Dry Wipes
Deionized Water

TOOLS REQUIRED:
Kit C:
    7/16” Socket, 3/8” Drive
Kit D:
    3/16” Hex Head, 3/8” Drive
Kit E:
    Ratchet 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
IVA Tool Box, Lid #1:
    Magnifying Glass 7x

REFERENCED PROCEDURE(S):
None

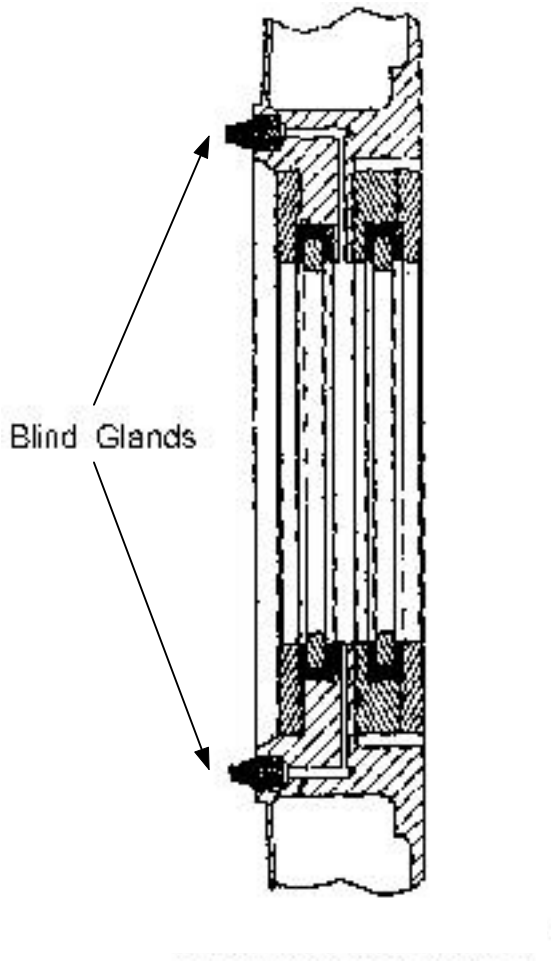


Figure 1.- Common Hatch Window.

WARNING
1. To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches should not be engaged.
2. Failure to equalize pressure between inner and outer windows may prevent removal of failed inner pane.

NOTE

Hatch plate assembly contains two blind glands; only one needs to be removed to equalize pressure.

REMOVE

1. Remove, temporary stow nut securing blind gland to hatch plate assembly (Ratchet 3/8” Drive, 7/16” Socket).

2. Place piece of tape on Hatch under “TEST” to mark alignment for replacement window.

> NOTE
>
> 1. 30 seconds must pass for pressure to equalize between inner and outer hatch windows.
>
> 2. Failed Inner Window ORU kit contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

3. Loosen fasteners (ten) securing failed Hatch Inner Window ORU kit to hatch plate assembly (Ratchet 3/8”, 3/16” Hex Head). Temporary stow.

> NOTE
>
> Hatch inner window ORU kit consists of Inner Window Assembly (one), window pane (one), window pane seal (two), and bumper (one). All parts of Failed Window ORU kit are removed from hatch plate assembly together.

4. Clean hatch plate window sealing surface (Dry Wipes, Deionized Water).

5. Dry hatch plate window sealing surface (Dry Wipes).

6. Inspect hatch plate assembly window area for foreign material on surface (Magnifying Glass 7x).

7. If there is no foreign material or visible scratches on surface
   Continue procedure.

   If there is foreign material or visible scratches on surface
   Reclean hatch plate window sealing surface.

REPLACE

> NOTE
>
> Replacement Inner Window ORU kit contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

8. Position Replacement Hatch Inner Window ORU kit hatch plate assembly by ensuring “TEST” is aligned with tape marker.

9. Align Replacement Hatch Inner Window ORU kit fasteners (ten) with holes (ten) in hatch plate assembly.

10. Visually inspect Replacement Hatch Inner Window ORU kit to ensure it is level.

11. If replacement hatch inner window is level, continue procedure.

    If window is not level, reposition window and continue procedure.

> NOTE
> Sequence for fastening captive fasteners (ten) will start at top center right, moving to bottom center left and continuing in star pattern until all captive fasteners (ten) are started.

12. Tighten fasteners (ten) securing Replacement Hatch Inner Window ORU kit to hatch plate assembly (Ratchet 3/8” Drive, 3/16” Hex Head).

13. Visually inspect Replacement Hatch Inner Window ORU kit to ensure it is properly seated.

14. If replacement hatch inner window properly seated, go to step 17.

    If window not properly seated, continue procedure.

15. Loosen captive fasteners (ten) securing Hatch Inner Window ORU kit to hatch plate assembly (Ratchet 3/8” Drive, 3/16” Hex Head).

16. Adjust Hatch Inner Window ORU kit until fully seated.

17. Torque captive fasteners (ten) securing Replacement Hatch Inner Window ORU kit to hatch plate assembly 112 $\pm$ 9 in-lbs (30-200 in-lbs Trq Wrench, 3/16” Hex Head).

18. Visually inspect Replacement Hatch Inner Window ORU kit to ensure it is properly seated.

19. If replacement hatch inner window not properly seated, go to step 15.

    If window properly seated, continue procedure.

20. Tighten nut over blind gland until blind gland is seated with no free movement (Ratchet 3/8” Drive, 7/16” Socket).

21. Tighten nut over blind gland an additional eighth of a turn (Ratchet 3/8” Drive, 7/16” Socket).

POST MAINTENANCE

16. Stow failed Inner Window, tools, equipment.

17. Update Maintenance Database.

HATCH OUTER WINDOW ASSEMBLY R&R

OBJECTIVE:
Remove and replace Hatch Outer Window Assembly (P/N 683-13030-1).

LOCATION:
Installed: U.S. Common Hatch
Stowed: √Maintenance Database

DURATION:
25 minutes

PARTS:
Hatch Inner Window Assembly (P/N 683-13030-1)

MATERIALS:
Dry Wipes
Deionized Water

TOOLS REQUIRED:
Kit C:
    7/16” Socket, 3/8” Drive
Kit D:
    3/16” Hex Head, 3/8” Drive
    5/32” Hex Head, 3/8” Drive
Kit E:
    Ratchet 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
IVA Tool Box, Lid #1:
    Magnifying Glass 7x

REFERENCED PROCEDURE(S):
None

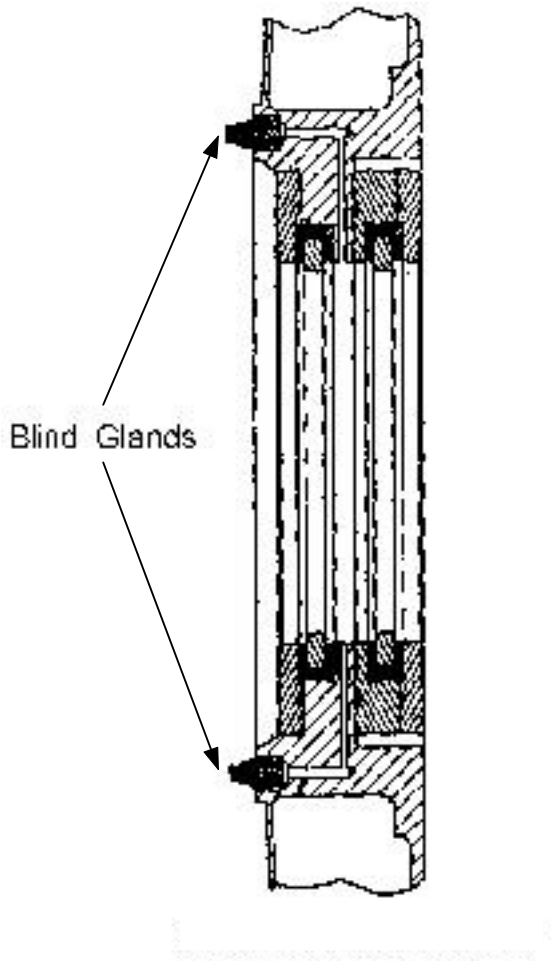


Figure 1.- Common Hatch Window.

WARNING
1. To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches should not be engaged.
2. Failure to equalize pressure between inner and outer windows may prevent removal of failed inner pane.

NOTE

Hatch plate assembly contains two blind glands; only one needs to be removed to equalize pressure.

REMOVE

1. Remove, temporary stow nut securing blind gland to hatch plate assembly (Dome side) (Ratchet 3/8” Drive, 7/16” Socket).

2. Translate to Rib side.

3. Place piece of tape on Hatch under “TEST” to mark alignment for replacement window.

4. Remove, temporary stow fasteners (two) securing indicator assembly (Ratchet 3/8” Drive, 5/32” Hex Head).

> NOTE
> 1. 30 seconds must pass for pressure to equalize between inner and outer hatch windows.
> 2. Failed outer window assembly contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

5. Loosen fasteners (ten) securing failed hatch outer window assembly to hatch plate assembly (Ratchet 3/8”, 3/16” Hex Head). Temporary stow.

6. Clean hatch plate window sealing surface (Dry Wipes, Deionized Water).

7. Dry hatch plate window sealing surface (Dry Wipes).

8. Inspect hatch plate assembly window area for foreign material on surface (Magnifying Glass 7x).

9. If there is no foreign material or visible scratches on surface
   Continue procedure.

   If there is foreign material or visible scratches on surface
   Reclean hatch plate window sealing surface.

REPLACE

> NOTE
> Replacement outer window assembly contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

10. Position replacement hatch outer window ORU kit hatch plate assembly by a ensuring “TEST” is aligned with tape marker.

11. Align replacement hatch outer window ORU kit fasteners (ten) with holes (ten) in hatch plate assembly.

12. Visually inspect replacement hatch outer window assembly to ensure it is level.

13. If replacement hatch outer window assembly is level, continue procedure.

    If assembly is not level, reposition window and continue procedure.

> NOTE
> Sequence for fastening captive fasteners (ten) will start at top center right, moving to bottom center left and continuing in star pattern until all captive fasteners (ten) are started.

14. Tighten fasteners (ten) securing replacement hatch outer window assembly to hatch plate assembly (Ratchet 3/8” Drive, 3/16” Hex Head).

15. Visually inspect replacement hatch outer window assembly to ensure it is properly seated.

16. If replacement hatch outer window assembly properly seated, go to step 19.

    If assembly not properly seated, continue procedure.

17. Loosen captive fasteners (ten) securing hatch outer window assembly to hatch plate assembly (Ratchet 3/8” Drive, 3/16” Hex Head).

18. Adjust outer window assembly until it is fully seated.

19. Torque captive fasteners (ten) securing replacement hatch outer window assembly to hatch plate assembly 112 $\pm$ 9 in-lbs (30-200 in-lbs Trq Wrench, 3/16” Hex Head).

20. Visually inspect replacement hatch outer window assembly to ensure it is properly seated.

21. If replacement hatch outer window assembly not properly seated
    Go to step 15.

    If assembly properly seated
    Continue procedure.

22. Tighten nut over blind gland until blind gland is seated with no free movement (Ratchet 3/8” Drive, 7/16” Socket).

23. Tighten nut over blind gland an additional eighth of a turn (Ratchet 3/8” Drive, 7/16” Socket).

POST MAINTENANCE

24. Stow failed Inner Window, tools, equipment.

25. Update Maintenance Database.

HATCH ROLLER ASSEMBLY R&R

OBJECTIVE:
Remove and replace a defective Hatch Roller Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance Database

DURATION:
10 minutes

PARTS:
Hatch Roller Assembly (P/N 683-13060-2)

MATERIALS:
None

TOOLS REQUIRED:
Kit C:
- 3/8” to 1/4” Adapter
- 3/8” 12 Pt Socket

Kit E:
- Ratchet, 1/4” Drive
- 4” Ext

Kit G:
- Trq Wrench (30-200 in-lbs)

REFERENCED PROCECURE(S):
None

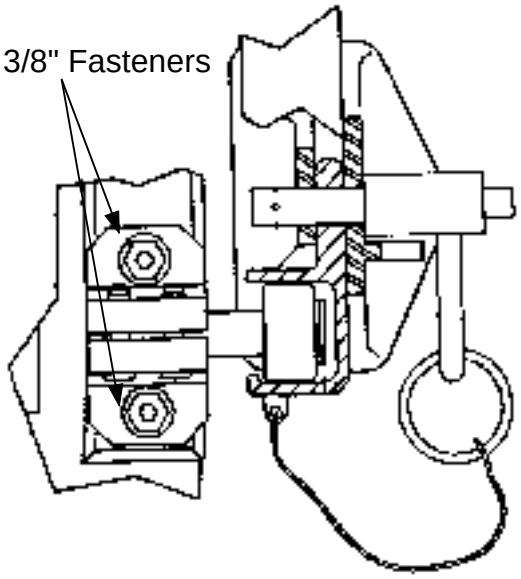


Figure 1.- Hatch Roller Assembly.

WARNING

To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches can not be engaged.

REMOVE

1. Close but do not latch Hatch.

2. Remove failed Roller Assembly, fasteners (two) (Ratchet 3/8” Drive, 3/8” Socket, 4” Ext).
   Label, temporary stow.

REPLACE

3. Install replacement Roller Assembly, Fasteners (two) torque to 98 ± 8 in-lbs (Ratchet 1/4” Drive; 3/8” to 1/4” Adapter, 3/8” Socket, 4” Ext) (30-200 in-lbs Trq Wrench).

POST MAINTENANCE

4. Operate Hatch in tracks to ensure proper operation of roller.

5. Stow failed roller assembly, equipment.

6. Update Maintenance Database.

HATCH SEAL R&R

OBJECTIVE:
Remove and replace Hatch Seal.

LOCATION:
Installed: Hatch Bulkhead
Stowed: √Maintenance Database

DURATION:

PARTS:
Hatch Seal (P/N 683-13095-3)

MATERIALS:
Dry Wipes
Tape
Gloves, Disposable
Braycote, Grease

TOOLS REQUIRED:
Fluid System Servicer
Kit D:
    1/8” Hex Head, 1/4” Drive
Kit E:
    Ratchet 1/4” Drive
    Driver Handle 1/4” Drive
Kit G:
    (5-35 in-lbs) Trq Driver, 1/4” Drive
IVA Tool Box, Lid #1:
    Nonmetallic Feeler Gauge
    Magnifying Glass (7X)

REFERENCED PROCEDURE(S):
None

REMOVE
1. Inspect replacement hatch seals visually for nicks, burrs, cuts, gouges, etc. that would impair proper seal (Magnifying Glass 7X).

NOTE

1. If defects found use another seal assembly.
2. Hatch seal has four assemblies. Only failed will be replaced.
3. Hatch seal assemblies adjacent to either end of failed hatch seal assembly must be loosened prior to removing failed hatch seal assembly.

2. Loosen fasteners (seventeen) on failed hatch seal.
3. Loosen, but do not release fasteners (thirty four) on two seals adjacent to failed seal (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).
4. Loosen fasteners (four) completely on end of one adjacent seal (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).
5. Loosen fasteners (four) completely on end of other adjacent seal (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

CAUTION

Do not damage bulkhead or adjacent seals when removing failed seal.

NOTE

Seal assembly contains lubricant. Avoid smearing on hands, glass, or hardware.

6. Separate, temporary stow failed seal.
7. Clean bulkhead sealing surface to visibly clean level (Dry Wipes).

REPLACE

8. Don gloves.
9. Clean replacement hatch seal to visibly clean level prior to installation (Dry Wipes).
10. Apply thin film of Braycote to crowns and ends of both seal beads and seal metal substrate on bulkhead side of seal.
11. Doff gloves.

CAUTION

When placing replacement hatch seal on bulkhead ensure captive fasteners do not scratch bulkhead surface.

12. Position seal on bulkhead, tighten fastener in center of seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

13. Tighten fastener (two) on each end of replacement seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

14. Tighten fastener on end of one adjacent seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

NOTE

Hatch seal assemblies must be held as close to bulkhead as possible to prevent damage to seals.

15. Grasp end of replacement seal by metal section and end of same adjacent seal in step 14 and mate ends of seals.

16. Seat replacement seal to same adjacent seal in step 14 by sliding joint approximately fifty percent beyond flush, then by returning to flush.

17. Tighten fastener on end of second adjacent hatch seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

18. Grasp other end of replacement hatch seal by metal section and end of second adjacent seal and mate ends.

19. Seat replacement seal other end to second adjacent seal in step 14 by sliding joint approximately fifty percent beyond flush, then returning to flush.

NOTE

Tighten fasteners alternating sides (left and right) working from center fastener toward ends.

20. Tighten fasteners (fifteen) on replacement seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

21. Tighten fasteners (sixteen) on adjacent seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

22. Tighten fasteners (sixteen) on remaining adjacent seal two full turns (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

23. Torque fasteners (seventeen) on replacement seal to 12 ± 2 in-lbs ((5-35 in-lbs) Trq Wrench, 1/8” Hex Head 1/4” Drive).

24. Torque fasteners (seventeen) on adjacent seal to 12 ± 2 in-lbs ((5-35 in-lbs) Trq Wrench, 1/8” Hex Head 1/4” Drive).

25. Torque fasteners (seventeen) on remaining adjacent seal to 12 ± 2 in-lbs ((5-35 in-lbs) Trq Wrench, 1/8” Hex Head 1/4” Drive).

26. Clean all hatch seals to visibly clean level (Dry Wipes).

27. Don gloves.

28. Lubricate hatch-side of all hatch seal crowns, joints, and black rubber bumpers (Braycote).

29. Doff gloves.

30. Mark approximate location of latches on inner side of Hatch, and Tape.

31. Close and latch Hatch.

NOTE
Gap between hatch plate and hatch seal metal substrate .015 to .025 inches at latches and .030 to .035 at each corner.

32. Measure gap at latches (eight) and corners (four) (Nonmetallic Feeler Gauge).

NOTE
Only latches out of tolerance need to be adjusted.

33. Open Hatch.

34. Translate to Rib side, close Hatch and operate until pointer is at "EQUALIZE" position.

35. Turn vertical adjustment screw one quarter turn CW to close gap, CCW to widen gap on each latch that is out of tolerance (Ratchet 1/4” Drive, 1/8” Hex Head 1/4” Drive).

36. Open Hatch.

37. Translate to dome side, close/latch Hatch and measure gaps (twelve) (Nonmetallic Feeler Gauge).

38. If gaps are within tolerance, continue with procedure.

    If gaps are not within tolerance, go to step 33.

39. Translate to Rib side with Fluid System Servicer.

40. Remove, temporary stow nut securing blind gland to hatch bulkhead (Ratchet 1/4” Drive, 7/16” Socket).

NOTE
Hatch seal integrity will be verified by leak test.

41. Attach FSS TBD adapter to FSS.

42. Attach FSS to bulkhead leak check port.

43. Close Hatch.

44. Operate FSS per operating procedures.

45. Draw vacuum through leak check port.

46. Leak rate of less than .0034 secs of air indicates seals acceptable.

47. Turn off FSS.

48. Disconnect FSS from bulkhead and adapter.

49. Tighten nut over blind gland until blind gland is seated with no free movement (Ratchet 1/4” Drive, 7/16” Socket 1/4” Drive).

50. Tighten nut over blind gland an additional eighth of a turn (Ratchet 1/4” Drive, 7/16” Socket 1/4” Drive).

POST MAINTENANCE

51. Stow failed hatch seal, tools, equipment.

52. Update Maintenance Database.

HATCH SOFT HANDLE ASSEMBLY R&R

OBJECTIVE:
Remove and replace a defective Hatch Soft Handle Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance Database

DURATION:
10 minutes

PARTS:
Hatch Soft Handle Assembly (P/N 683-13048)

MATERIALS:
None

TOOLS REQUIRED:
Kit C:
- 3/8” to 1/4” Adapter
- 3/8” 12 Pt Socket

Kit E:
- Ratchet 1/4” Drive
- 4” Ext

Kit G:
- Trq Wrench (30-200 in-lbs)

REFERENCED PROCEDURE(S):
None

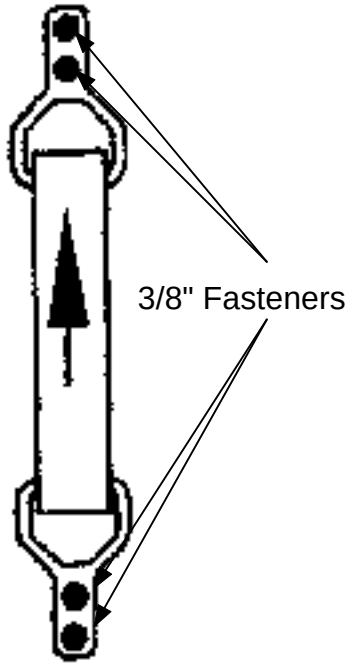


Figure 1.- Hatch Soft Handle.

WARNING

To ensure crewmembers have immediate ingress/egress between modules in case of emergency, hatch latches can not be engaged.

REMOVE

1. Close but do not latch Hatch.

2. Remove failed soft handle, fasteners (four) (Ratchet 1/4” Drive, 3/8” Socket, 4” Ext).
   Label, temporary stow.

REPLACE

3. Install replacement soft handle assembly, fasteners (four) torque to 90 ± 6 in-lbs (Ratchet 1/4” Drive, 3/8” to 1/4” Adapter, 3/8” Socket, 4” Ext, Trq Wrench).

POST MAINTENANCE

4. Stow failed soft handle, tools.

5. Update Maintenance Database.

HATCH TENSION ROD/LATCH R&R

OBJECTIVE:
Remove and replace Tension Rod/Latch Assembly.

LOCATION:
Installed: U.S. Common Hatch Rib Side
Stowed: √Maintenance Database

DURATION:
25 minutes

PARTS:
Hatch Tension Rod Assembly (PN 683-13012-1)

MATERIALS:
None

TOOLS REQUIRED:
Kit A:
- 7/16” Combination Wrench
- 9/16” Combination Wrench
- 9/16” Crowfoot, 3/8” Drive

Kit C:
- 1/2” Socket, 3/8” Drive

Kit D:
- 1/8” Hex Head, 3/8” Drive

Kit E:
- Ratchet 3/8” Drive
- 1/4”-3/8” Adapter
- 4” Ext 3/8” Drive

Kit G:
- (30-200 in-lbs)Trq Wrench, 3/8” Drive
- (5-35 in-lbs)Trq Driver, 1/4” Drive

Kit J:
- Retaining Ring Tool Straight

IVA Tool Box, Lid #1:
- Nonmetallic Feeler Gauge
- Caliper, Dial Type

REFERENCED PROCEDURE(S):
LCN S9ASHA, Task GBCOAAA

WARNING

To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches can not be engaged.

NOTE

Tension rod assembly and latch assembly remain together and are moved to maintenance work area for separation, because of small parts.

REMOVE

1. Close, do not latch Hatch.
2. Unfasten captive fasteners (four) (Ratchet 3/8” Drive) (1/2” Socket) (4” Ext).
3. Release quick release pin (one) securing failed tension rod assembly to slider.
4. Place failed tension rod in maintenance work area.
5. Remove retaining ring from pin (Retaining ring pliers).
6. Remove pin (one) securing tension rod to latch.
7. Separate tension rod, latch.
8. Replace failed part with new tension rod/latch depending on which part has failed.
9. Insert pin into aligned tension rod/latch.
10. Install retaining ring onto end of pin (Retaining ring pliers).

REPLACE

11. Position latch assembly onto hatch plate.
12. Hand tighten captive fasteners (four). Torque fasteners (four) to 188 in-lbs. ((30-200 in-lbs) Trq Wrench, Ratchet 3/8” Drive, 1/2” Socket, 4” Ext).
13. Align tension rod to slider hole, insert quick disconnect pin.

NOTE

Hatch should be in fully unlatched position before continuing with procedure. Failure to do so may result in improper latch adjustment.

14. Rotate set screw on top of latch clockwise until it stops (Ratchet 3/8” Drive) (1/8” Hex Head).

15. Loosen jam nut on tension rod (9/16” Combination Wrench).

16. Find dead center point of latch travel by rotating tension rod CCW until vertical movement of latch roller reverses direction (7/16” Combination Wrench).

17. Rotate tension rod CW until latch roller begins to move away from hatch plate.

18. Verify that the gap between the latch roller and hatch plate does not exceed .0015 (Feeler Gauge).

19. If gap is per requirements, continue with maintenance procedure.

20. If not set per requirements, reposition roller to gap measurement.

21. Tighten jam nut on tension rod.

22. Torque jamnut to 20 in-lbs (5-35 in-lbs) Trq Driver, 1/4” to 3/8” Adapter, 9/16” Crowfoot.

23. Adjust setscrews to achieve 1.100/1.050” dimension between hatch plate and nearest point of latch roller (1/8” Hex Head).

24. Verify measurement (Caliper).

25. If gap is per requirements, continue procedure.

26. If gap is not per requirements, reposition latch assembly to proper gap measurement (1/8” Hex Head).

27. Measure length of an adjacent tension rod shaft from base of jam nut to edge of latch attach bracket (Caliper).

28. If lengths are not equal ± .050”, readjust tension rod.

29. If lengths are equal ± .050”, continue procedure.

30. Turn crank to ensure proper operation of Hatch.

31. Latch Hatch to check seal gap in accordance with LCN S9ASHA, Task GBCOAAA.

POST MAINTENANCE

32. If gap is per requirement, continue procedure.

33. If gap is not per requirement, gap in accordance with LCN S9ASHA, Task GBCOAAA.

34. Stow failed tension/latch assembly, tools, and maintenance supplies.

35. Update Maintenance Database.

IMV FAN R&R NODE 1

OBJECTIVE:
Remove and replace failed IMV Fan.

LOCATION:
Installed: NOD1P1, NOD1S1, NOD1S3, NOD1O1, TBD

DURATION:
25 minutes

PARTS:
IMV Fan (P/N SV809111-1)

MATERIALS:
Tape

TOOLS REQUIRED:
Equipment Bag
Kit C:
- 1/4” Socket, 1/4” Drive
- 7/16” Socket, 1/4” Drive

Kit E:
- 10” Ext 1/4” Drive
- 4” Ext 1/4” Drive
- Ratchet 1/4” Drive

Kit F:
- 5/32” 6 Pt Socket 1/4” Drive

Kit G:
- (5-35 in-lbs) Trq Driver, 1/4” Drive

REFERENCED PROCEDURE(S):
NODE 1 ALCOVE SHEAR PANEL REMOVE ZENITH (NADIR)
NODE 1 ALCOVE SHEAR PANEL REMOVE STBD
NODE 1 ALCOVE SHEAR PANEL REMOVE PORT
NODE 1 MIDBAY SHEAR PANEL REMOVE STBD

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

1. Remove power from IMV Fan via software. TBD

ACCESS

Table 1. Closeout Panel for Node 1 IMV Fans.

Panel Location	Number of fasteners	Tool
NOD1P1	14	5/32” 6 Pt Socket, Ratchet 1/4” Drive---TBD
NOD1S1	14	5/32” 6 Pt Socket, Ratchet 1/4” Drive---TBD
NOD1O1	10	5/32” 6 Pt Socket, Ratchet 1/4” Drive---TBD
NOD1S3	TBD	TBD

2. If Shear Panels have not been removed
   Perform appropriate shear panel removal procedure. See Table 1.
   NODE 1 ALCOVE SHEAR PANEL REMOVE ZENITH (NADIR)
   NODE 1 ALCOVE SHEAR PANEL REMOVE STBD
   NODE 1 ALCOVE SHEAR PANEL REMOVE PORT
   NODE 1 MIDBAY SHEAR PANEL REMOVE STBD

   If Shear Panels have been removed
   Go to step 3.

WARNING

Burn hazard exists for failure to allow IMV Fan to cool down for two hours prior to removal.

REMOVE IMV FAN

3. Power cable PTBD (PG1) ←|→ J2.

4. Data cable PTBD (PG1) ←|→ J1.

5. Unfasten grounding strap TBD fastener (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

6. Unfasten IMV Fan inlet air manifold hose clamp (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

7. Push clamp onto duct.

8. Unfasten IMV Fan outlet air manifold hose clamp (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

9. Push clamp onto duct.

10. Remove, temporary stow IMV Fan, fasteners (four) (7/16” Socket, 10” Ext, Ratchet 3/8” Drive).

REPLACE IMV FAN

11. Remove electrical connector caps (two) from replacement IMV Fan, install on failed IMV Fan.

12. Install replacement IMV Fan by aligning it on guide pins.

13. Tighten IMV Fan structural support fasteners (four), torque to 30 in-lbs (3/8” Socket, 4” Ext., (5-35 in-lbs) Trq Wrench).

14. Install, snug IMV Fan inlet air manifold clamp (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

15. Install, snug IMV Fan outlet air manifold clamp (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

16. Fasten grounding strap TBD fastener (1/4” Socket, 4” Ext, Ratchet 1/4” Drive).

17. Power cable PTBD (PG1) →|← J2.

18. Data cable PTBD (PG1) →|← J1.

CHECK OUT IMV FAN

19. Supply power to IMV Fan via software. TBD

20. Perform TBD BIT.

CLOSE OUT IMV FAN

21. Install Closeout Panel for appropriate IMV Fan. See Table 1.

22. Stow failed ORU, tools, equipment.

23. Update Maintenance Database.

RPCM R&R NOD1D1

OBJECTIVE:
Remove a failed RPCM and replace it with a spare.

LOCATION:
Installed: NOD1D1
Stowed: √Maintenance Database

DURATION:
30 minutes (If Alcove Shear Panels have been removed).

PARTS:
RPCM-Int Type V (P/N R077419-51)

MATERIALS:
Wet Wipes
Plastic Bags

TOOLS REQUIRED**:**
Equipment Bag
Tethers
Kit E:
- Ratchet 3/8” Drive
- 6” Ext 3/8” Drive
- Driver Handle 1 /4” Drive

Kit D:
- 5/32” Hex Head Driver, 1 /4” Drive

Kit R:
- 7/16” x 6” Wobble Socket Extension, 3/8” Drive

Kit G:
- (5-35 in-lbs) Trq Driver
- (30-200 in-lbs) Trq Wrench

REFERENCED PROCEDURE(S):
NODE1 ALCOVE DECK SHEAR PANEL REMOVAL
RACU5 DEACTIVATION
RACU6 DEACTIVATION
APCU DEACTIVATION
RACU5 ACTIVATION
RACU6 ACTIVATION
APCU ACTIVATION

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Don Anti-Static wrist tether.

2. Safe failed RPCM for maintenance by isolating upstream power source. Refer to Table 1 for correct procedure.

Table 1

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 DEACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 DEACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU DEACTIVATION
N14B A, B,C	APCU 2	(SODF) APCU DEACTIVATION

ACCESS

3. Remove, temporary stow Closeout Panel NOD1D1-01, fasteners (ten) (Handle 1 /4" Drive, 5/32" Hex Head Driver).

4. If Alcove Deck Shear Panels have not been removed
   Perform NODE 1 ALCOVE DECK SHEAR PANEL REMOVAL

   If Alcove Deck Shear Panels have been removed
   Go to step 5.

REMOVE

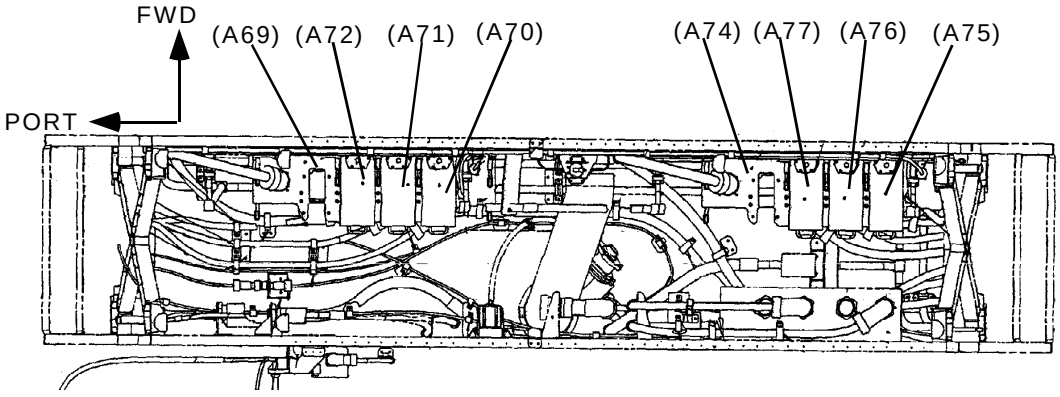


Figure 1.- Nadir View of Node 1 Alcove Deck (with Closeout and Shear Panel Removed).

Table 2.

Name	Ref. Designator	RPCM Type
RPDA N1-RS2	(A74)	N/A
RPCM N1-RS2-A	(A75)	V
RPCM N1-RS2-B	(A76)	V
RPCM N1-RS2-C	(A77)	V
RPDA N1-3B	(A69)	N/A
RPCM N1-3B-A	(A70)	V
RPCM N1-3B-B	(A71)	V
RPCM N1-3B-C	(A72)	V

5. Locate failed RPCM.
   See Table 1 and Figure 1.

CAUTION
1. Failure to use 7/16” x 6” Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on socket while inserting can result in damage to RPCM Drive Screw Assembly.

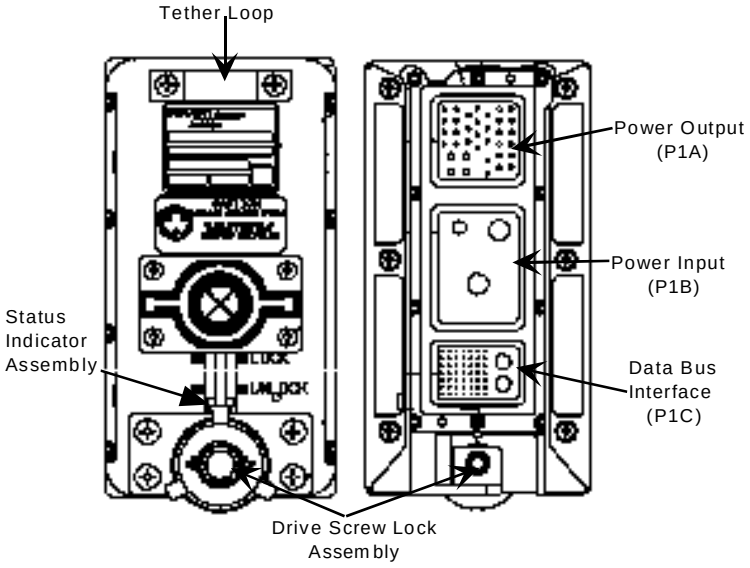


Figure 2.- Remote Power Control Module (Front and Back).

6. Align and insert 7/16” x 6” Wobble Socket Ext into failed RPCM lock assembly until it bottoms out, locking springs have released the drive screw. See Figure 2.

7. Apply constant pressure to release RPCM lock springs without rotational motion, loosen failed RPCM drive screw (nine turns) (Ratchet 3/8” Drive, 7/16” x 6” Wobble Socket Ext). See Figure 2.

NOTE
1. RPCM Status Indicator will move from the LOCK line to the UNLOCK line when Drive Screw Assembly is disengaged. 2. RPCM Status Indicator may remain at or below UNLOCK line when RPCM is removed from RPDA.

8. √Status indi - UNLOCK

9. Label, remove failed RPCM from RPDA by sliding it off guide rails.

10. Verify replacement RPCM part number RPCM-Int Type V (P/N R077419-51).

11. Remove electrical connector protective cap from replacement RPCM to failed RPCM. Temporary stow failed RPCM.

REPLACE

12. Inspect RPCM and mounting location for foreign matter/debris, damage to alignment guides, pins.

13. Clean coldplate bonding surface with wet wipes.

CAUTION
All internal RPCMs have the same physical characteristics. Forcing incorrect spare RPCM into receptacle could damage key and bend RPCM connector pins.

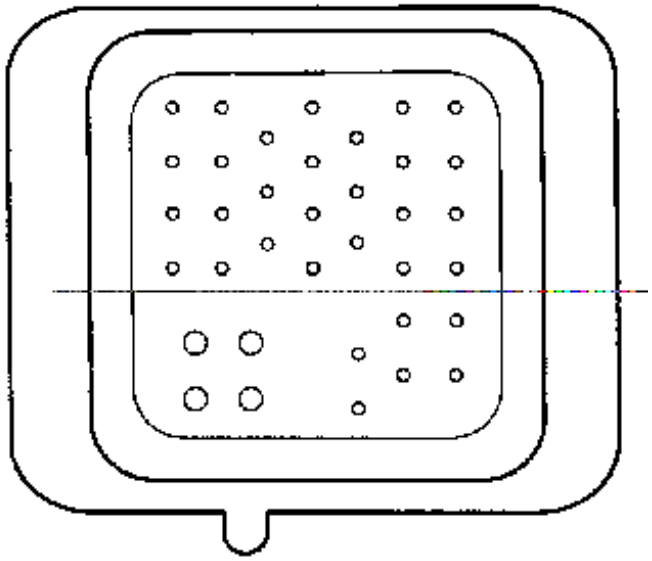


Figure 3.- RPCM Int Ty-V Power Out Connector (Node 1).

14. Verify replacement RPCM Power Out connectors pins. See Figure 3.

15. Position replacement RPCM on guide rails of RPDA.

16. Insert RPCM into RPCM receptacle until status indicator reaches UNLOCK position.

CAUTION
1. Failure to use 7/16” x 6” Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on socket while inserting, can result in damage to RPCM Drive Screw Assembly.

17. Align and insert 7/16” x 6” Wobble Socket Ext into failed RPCM lock assembly until it bottoms out, locking springs have released the drive screw. See Figure 2.

18. Apply constant pressure to release RPCM lock springs without rotational motion, tighten RPCM drive screw, torque to 60 in-lbs (Ratchet 3/8” Drive, 7/16” x 6” Wobble Socket Ext, (30-200 in-lbs) Trq Wrench).

19. √Status indi - LOCK

CHECK OUT

20. Reapply power to RPCM by activating upstream power source. Refer to Table 3 for correct procedure.

Table 3

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 ACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 ACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU ACTIVATION
N14B A, B,C	APCU 2	(SODF) APCU ACTIVATION

CLOSE OUT

21. Install Closeout Panel NOD1D1-01, fasteners (ten) torque to 14 in-lbs (Handle 1 /4" Drive, 5/32" Hex Head Driver, (5-35 in-lbs) Trq Driver).

POST MAINTENANCE

22. Stow failed RPCM, tools, equipment.

23. Update Maintenance Database.

RPCM R&R NOD1O1

OBJECTIVE:
Remove a failed RPCM and replace it with a spare.

LOCATION:
Installed: NOD1O1
Stowed: √Maintenance Database

DURATION:
30 minutes (If Alcove Shear Panels have been removed)

PARTS:
RPCM-Int Type V (P/N R077419-51)

MATERIALS:
Wet Wipes
Plastic Bag

TOOLS REQD:
Equipment Bag
Tethers
Kit E:
- Ratchet 3/8” Drive
- Ratchet 1/4” Drive (RPDA N1RS1 Only)
- 6” Ext 3/8” Drive
- 4” Ext 1/4” Drive (RPDA N1RS1 Only)
- Driver Handle 1/4” Drive

Kit F:
- 5/16” Socket 1/4” Drive (RPDA N1RS1 Only)

Kit D:
- 5/32” Hex Head Driver, 1/4” Drive

Kit R:
- 7/16” x 6” Wobble Socket Extension, 3/8” Drive

Kit G:
- (5-35 in-lbs) Trq Driver
- (30-200 in-lbs) Trq Wrench

REFERENCED PROCEDURE(S):
NODE1 ALCOVE OVHD SHEAR PANEL REMOVAL
RACU5 DEACTIVATION
RACU6 DEACTIVATION
APCU DEACTIVATION
RACU5 ACTIVATION
RACU6 ACTIVATION
APCU ACTIVATION

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Don Anti-Static wrist tether.

2. Safe failed RPCM for maintenance by isolating upstream power source. Refer to Table 1 for correct procedure.

Table 1

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 DEACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 DEACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU DEACTIVATION
N14B A, B,C	APCU 2	(SODF) APCU DEACTIVATION

ACCESS

3. Remove, temporary stow Closeout Panel NOD1O1-01, fasteners (ten) (Handle 1/4” Drive, 5/32” Hex Head Driver).

4. If Alcove Ovhd Shear Panels have not been removed
   Perform NODE 1 ALCOVE SHEAR PANEL REMOVAL

   If Alcove Ovhd Shear Panels have been removed
   Go to step 5.

REMOVE

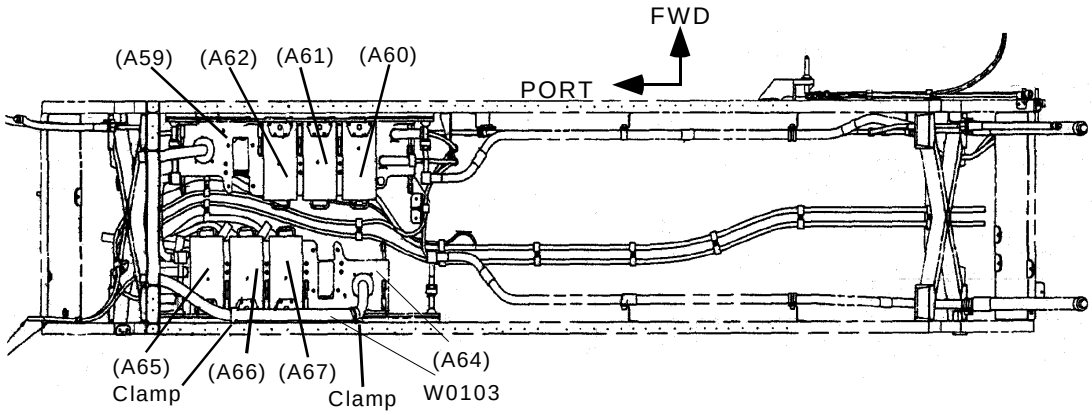


Figure 1.- Ovhd View of Node 1 Forward Ovhd Alcove (with Closeout and Shear Panel Removed).

Table 2

Name	Ref. Designator	RPCM Type
RPDA N1RS1	(A64)	N/A
RPCM N1RS1-A	(A65)	Int Ty-V
RPCM N1RS1-B	(A66)	Int Ty-V
RPCM N1RS1-C	(A67)	Int Ty-V
RPDA N14B	(A59)	N/A
RPCM N14B-A	(A60)	Int Ty-V
RPCM N14B-B	(A61)	Int Ty-V
RPCM N14B-C	(A62)	Int Ty-V

5. Locate failed RPCM. See Figure 1 and Table 2.

6. If failed RPCM located on RPDA N1RS1
   Remove cable wire harness W0103 from clamps (two) (5/16” Socket, 1/4” Drive, 4” Ext, 1/4” Drive, Ratchet 1/4” Drive). See Figure 1.

   If failed RPCM not located on RPDA N1RS1
   Go to step 7.

CAUTION
1. Failure to use 7/16” x 6” Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on socket while inserting, can result in damage to RPCM Drive Screw Assembly.

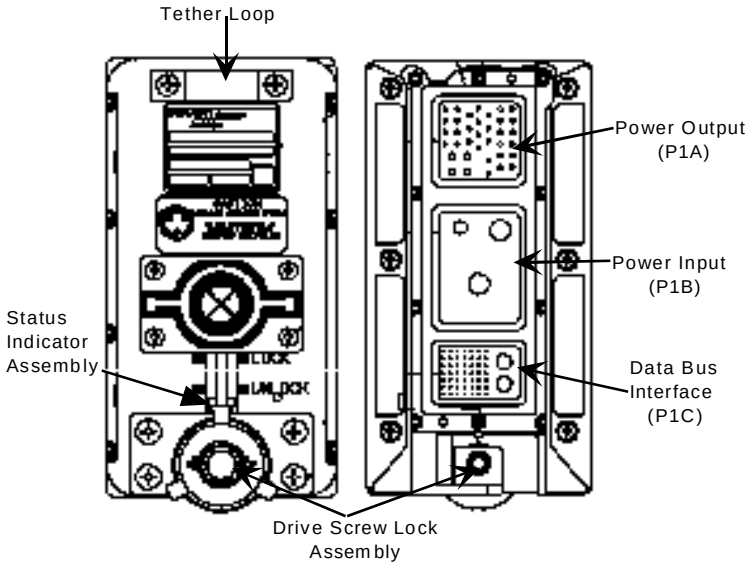


Figure 2.- Remote Power Control Module (Front and Back).

7. Align and insert 7/16” x 6” Wobble Socket Ext into failed RPCM lock assembly until it bottoms out, locking springs have released the drive screw. See Figure 2.

8. Apply constant pressure to release RPCM lock springs without rotational motion, loosen failed RPCM drive screw (nine turns) (Ratchet 3/8” Drive, 7/16” x 6” Wobble Socket Ext). See Figure 2.

NOTE
1. RPCM Status Indicator will move from the LOCK line to the UNLOCK line when Drive Screw Assembly is disengaged. 2. RPCM Status Indicator may remain at or below UNLOCK line when RPCM is removed from RPDA.

9. √Status indi - UNLOCK

NOTE
If failed RPCM located on RPDA N1RS1, cable wire harness W0103 must be moved out the path when removing RPCM from RPDA N1RS1.

10. Label, remove failed RPCM from receptacle by sliding it off guide rails.

11. Verify replacement RPCM part number RPCM-Int Type V (P/N R077419-51).

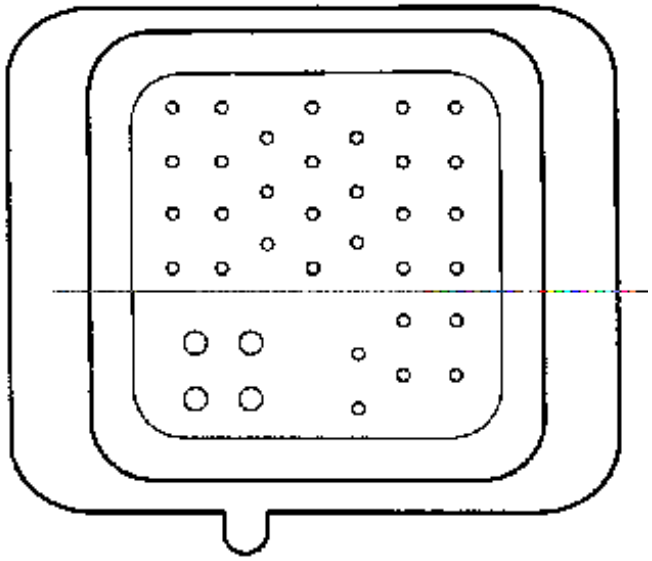
12. Remove electrical connector protective cap from replacement RPCM, install on failed RPCM. Temporary stow failed RPCM.

REPLACE

13. Inspect RPCM and mounting location for foreign matter/debris, damage to alignment guides, pins.

14. Clean coldplate bonding surface with Wet Wipes.

CAUTION
All internal RPCMs have the same physical characteristics. Forcing incorrect spare RPCM into receptacle could damage key and bend RPCM connector pins.



Type V
Pin Configuration

Figure 3.- RPCM-Int Ty-V Power Out Connector (Node 1).

15. Verify replacement RPCM Power Out connectors pins. See Figure 3.

NOTE
When installing replacement RPCM on RPDA N1RS1, move cable wire harness W0103 out the path when inserting RPCM on RPDA.

16. Position replacement RPCM on guide rails of RPDA.

17. Insert RPCM into RPCM receptacle until status indicator reaches UNLOCK position.

CAUTION
1. Failure to use 7/16” x 6” Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on socket while inserting, can result in damage to RPCM Drive Screw Assembly.

18. Align and insert 7/16” x 6” Wobble Socket Ext into failed RPCM lock assembly until it bottoms out, locking springs have released the drive screw. See Figure 2.

19. Apply constant pressure, tighten RPCM drive screw (six turns), torque to 60 in-lbs (Ratchet, 3/8” Drive, 7/16” x 6” Wobble Socket Ext, (30-200 in-lbs) Trq Wrench).

20. √Status indi - LOCK

21. If replacement RPCM located on RPDA N1RS1
    Install cable wire harness W0103 on clamps (two) (5/16” Socket, 1/4” Drive, 4” Ext, 1/4” Drive, Ratchet 1/4” Drive). See Figure 1.

    If replacement RPCM not located on RPDA N1RS1
    Go to step 22.

CHECK OUT

22. Reapply power to RPCM by activating upstream power source. Refer to Table 3 for correct procedure.

Table 3

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 ACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 ACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU ACTIVATION
N14B A, B,C	APCU 2	(SODF) APCU ACTIVATION

CLOSE OUT

23. Install Closeout Panel NOD1O1-01. Fasteners (ten), torque to 14 in-lbs (Handle 1/4” Drive, 5/32” Hex Head Driver, (5-35 in-lbs) Trq Driver).

POST MAINTENANCE

24. Stow failed RPCM, tools, equipment.

25. Update Maintenance Database.

S&M PROCEDURES

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RACK ROTATE GENERIC

OBJECTIVE**:**
Rotate rack.

LOCATION:
USOS

DURATION:
Five minutes.

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
Kit D:
6”, 3/8” Hex Head, 3/8” Drive
Kit E:
Ratchet 3/8” Drive

REFERENCED PROCEDURES:
None

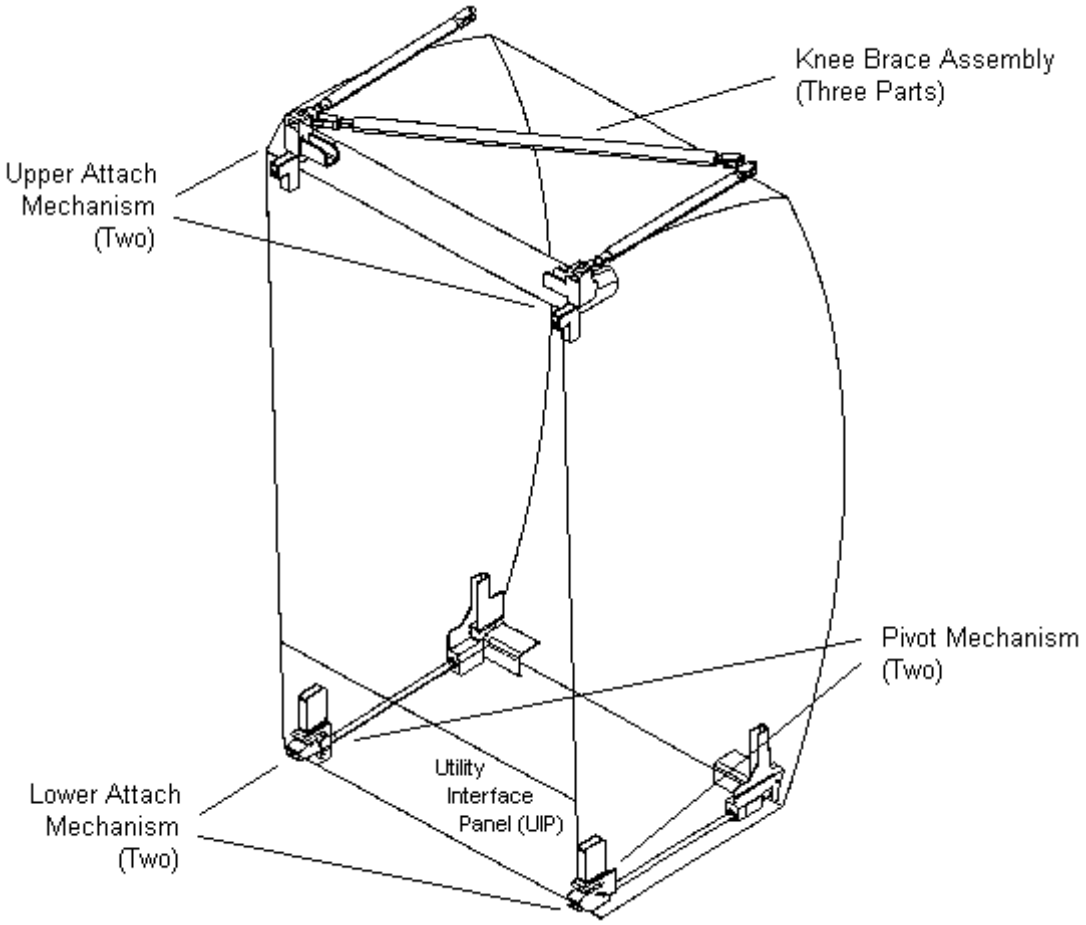


Figure 1.- Rack Attachment Mechanisms.

SAFE

CAUTION

All equipment, tools must be removed from rack rotation path, to prevent equipment damage.

1. Inspect rack area, remove any unnecessary equipment protruding into rack rotation path.

ACCESS

2. Install handrails on adjacent racks, if required.

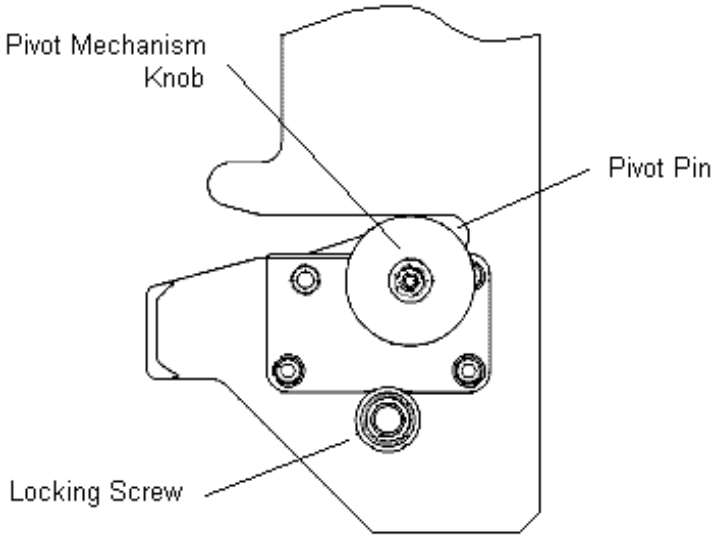


Figure 2.- Lower Attach Mechanism (inside left).

3. Verify left and right Pivot Mechanism Knobs are in closed, up position. See Figure 2.

DISENGAGE RACK UPPER ATTACH MECHANISMS

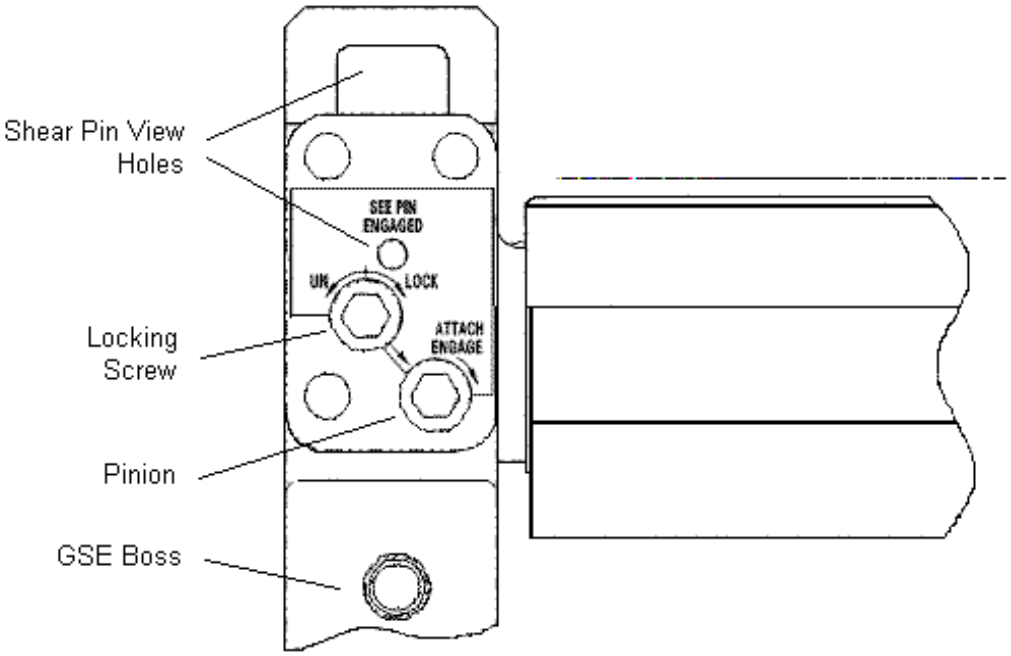


Figure 3.- Upper Attach Mechanism (left side).

4. Loosen left Locking Screw (Ratchet 3/8” Drive, 3/8” Hex Head) 10 --- 12 turns or until hard stop. See Figure 3.

NOTE
Upper Attach Mechanism Pinions have mirror-image gearing. To disengage left pinion, turn↶. To disengage right pinion, turn↷.

5. Disengage left Pinion (Ratchet 3/8” Drive, 3/8” Hex Head) until hard stop. See Figure 3.

6. Repeat steps 4 through 5 for right Upper Attach Mechanism.

ROTATE RACK DOWN

7. Remove handrails on rack being rotated, if required.

CAUTION
All equipment, tools must be removed from rack rotation path, to prevent equipment damage.

8. Verify that all unnecessary equipment protruding into rack rotation path has been removed.

WARNING
1. Due to rack inertia, do not release rack prior to controlled stop.
2. Avoid pinch points between adjacent racks.

9. Slowly tilt rack down. Temporary restrain.

10. Perform predefined maintenance task.

ROTATE RACK UP

CAUTION
All equipment, tools must be removed from space behind, around rack to prevent equipment damage.

11. Inspect rack area, ensure all equipment and tools are removed from area behind rack.

WARNING
1. Due to rack inertia, do not release rack prior to controlled stop.
2. Avoid pinch points between adjacent racks.

12. Grasp rack, slowly rotate rack up into installed position and place Knee Brace Fittings into Upper Attach Mechanism Shear Pin View Holes. See Figure 3.

ENGAGE RACK UPPER ATTACH MECHANISMS

> NOTE
> Upper Attach Mechanism Pinions have mirror-image gearing. To engage left pinion, turn ↻. To engage right pinion, turn ↺.

13. Fully engage both Upper Attach Mechanism Pinions (Ratchet 3/8" Drive, 3/8" Hex Head) until hard stop. Shear Pin shoulder should be visible at top of mechanism. See Figure 3.

14. Tighten, snug both Locking Screws (Ratchet 3/8" Drive, 3/8" Hex Head). See Figure 3.

POST MAINTENANCE

15. Stow tools.

16. Update Maintenance Database.

FWD CBM CPA CHECKOUT NODE 1

OBJECTIVE:
Checkout Node 1 Forward Controller Panel Assemblies following remove and replace operation.

LOCATION:
NOD1/US PCS

DURATION:
One hour

REFERENCED PROCEDURE(S):
None

1. VERIFY APCU POWER ON

TBD √APCU 1,2 CONVERTER tb - Gray
√APCU 1,2 OUTPUT tb - Gray

2. INHIBIT CBM PRIMARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

√SPD 1 Ch 2 A - X

sel CB GNC 1
sel RT Status

CB GNC RT Status

sel Inhib FDIR RT Commands

N1 1 MDM CB GNC 1 Inhib FDIR

cmd Inhib FDIR CBM N1 Fwd Prim **Execute**

CB GNC RT Status

√RT FDIR Inhibited Number 18 - X

3. INHIBIT CBM SECONDARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

√SPD 1 Ch 2 A - X

sel CB GNC 2
sel RT Status

CB GNC RT Status

sel Inhib FDIR RT Commands

N1 2 MDM CB GNC 2 Inhib FDIR

cmd Inhib FDIR CBM N1 Fwd Sec **Execute**

CB GNC RT Status

√RT FDIR Inhibited Number 18 - X

4. CLOSE PRIMARY RPCs

PCS S&M

N1 Active CBM Display
'(Center Table)'

sel N1 Fwd
sel Command/Procedures
sel Other Commands
sel Fwd CBM RPC Commands

CBM Forward CBM RPC Commands

sel [X] and [Y] values [X] = 3 4 5 6
[Y] = 1 2 3 4

cmd RPCM N13B C RPC [X] CBM N1 Fwd Pri [Y] Cl **Execute**

N1 Active CBM Display
'N1 Fwd CBM Data'

√RPCM N13B C RPC [X] Cntr Asy [Y] - Cl

Repeat

5. ACTIVATE FORWARD CBM PRIMARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Active

cmd CBM State to Active N1 Fwd Master 1 **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - ACTV
√N1 Fwd State - PRI
√N1 Fwd Comm Error - No X

sel BIT results

N1 Active CBM Bit Results

√No Xs

6. SET CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in "485 Bus Used" telemetry field.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus 'X' **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT

7. VERIFY RS-485 COMM STATUS

N1 Active CBM Display
'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
If any Bolt or Latch Cmd Status - MSBD

'(Center Table)'

sel Command/Procedures
sel Other Commands
sel BIT Commands

CBM Bit Commands

cmd CBM Act Bit Active CBM All Ctrlr **Execute**

N1 Active CBM Display
'(CBM Graphic)'

√Conf Request - BIT

'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Confirm/Nonconfirm

CBM Confirm Nonconfirm

cmd CBM Confirmation Cmd **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - BIT
√Latch 1-1 Cmd Code - BIT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT

'(Center Table)'

sel BIT Results
N1 Active CBM Bit Results

√No Xs

8. VERIFY CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in “485 Bus Used” telemetry field.

Node 1 Active CBM Display
‘N1 Zen’

√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0
If any Bolt or Latch Posn ≠ 0

N1 Active CBM Display
‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
‘(Center Table)’

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD

‘N1 Zen’

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0

9. DEACTIVATE FWD CBM PRIMARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Deactive

cmd CBM State to Deactivate N1 Fwd **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - DEAC

10. ACTIVATE FORWARD CBM SECONDARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Active

cmd CBM State to Active N1 Fwd Master 2 **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - ACTV
√N1 Fwd State - SEC
√N1 Fwd Comm Error - No X

sel BIT results

N1 Active CBM Bit Results

√No Xs

11. SET CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in “485 Bus Used” telemetry field.

N1 Active CBM Display
‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
‘(Center Table)’

√Master Cmd status - CPLT

12. VERIFY RS-485 COMM STATUS

N1 Active CBM Display
‘N1 Zen’

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
If any Bolt or Latch Cmd Status - MSBD

‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel BIT Commands

CBM Bit Commands

cmd CBM Act Bit Active CBM All Ctrlr **Execute**

N1 Active CBM Display
‘(CBM Graphic)’

√Conf Request - BIT

‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel Confirm/Nonconfirm

CBM Confirm Nonconfirm

cmd CBM Confirmation Cmd **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - BIT
√Latch 1-1 Cmd Code - BIT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT

'(Center Table)'

Sel BIT Results
N1 Active CBM Bit Results

√No Xs

13. VERIFY CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in "485 Bus Used" telemetry field.

Node 1 Active CBM Display
'N1 Zen'

√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0
If any Bolt or Latch Posn ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0

14. DEACTIVATE FWD CBM SECONDARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Deactive

cmd CBM State to Deactivate N1 Fwd **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - DEAC

15. OPEN PRIMARY RPCs

N1 Active CBM Display
'(Center Table)'

sel N1 Fwd
sel Command/Procedures
sel Other Commands
sel Fwd CBM RPC Commands

CBM Forward CBM RPC Commands

sel [X] and [Y] values [X] = 3 4 5 6
[Y] = 1 2 3 4

cmd RPCM N13B C RPC [X] CBM N1 Fwd Pri [Y] Op **Execute**

N1 Active CBM Display
'N1 Fwd CBM Data'

√RPCM N13B C RPC [X] Cntr Asy [Y] - Op

Repeat

16. CLOSE SECONDARY RPCs

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Fwd CBM RPC Commands

CBM Forward CBM RPC Commands

sel [X] and [Y] values [X] = 2 3 14 15
[Y] = 1 2 3 4

cmd RPCM N14B A RPC [X] CBM N1 Fwd Sec [Y] Cl **Execute**

N1 Active CBM Display
'N1 Fwd CBM Data'

√RPCM N14B A RPC [X] Cntr Asy [Y] - Cl

Repeat

17. SWITCH CB-GNC-1 BUS CHANNELS

PCS Node 1: CDH

Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

sel SPD 1

SPD Card 1

sel Commands

N1 1 SPD Card 1

cmd N1 1 MDM CB GNC 1 Sel Ch B

Secondary NCS MDM Node 1

√SPD 1 Ch 2B - X

18. SWITCH CB-GNC-2 BUS CHANNELS

PCS Node 1: CDH
Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

sel SPD 1

SPD Card 1

sel Commands

N1 1 SPD Card 1

cmd N1-2 MDM CB-GNC-2 Sel Ch B

Primary NCS MDM Node 1

√SPD 1 Ch 2 B - X

19. ACTIVATE FORWARD CBM PRIMARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Active

cmd CBM State to Active N1 Fwd Master 1 **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - ACTV
√N1 Fwd State - PRI
√N1 Fwd Comm Error - No X

sel BIT results

N1 Active CBM Bit Results

√No Xs

20. SET CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in “485 Bus Used” telemetry field.

N1 Active CBM Display
‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
‘(Center Table)’

√Master Cmd status - CPLT

21. VERIFY RS-485 COMM STATUS

N1 Active CBM Display
‘N1 Zen’

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
If any Bolt or Latch Cmd Status - MSBD

‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel BIT Commands

CBM Bit Commands

cmd CBM Act Bit Active CBM All Ctrlr **Execute**

N1 Active CBM Display
'(CBM Graphic)'

√Conf Request - BIT

'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Confirm/Nonconfirm

CBM Confirm Nonconfirm

cmd CBM Confirmation Cmd **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - BIT
√Latch 1-1 Cmd Code - BIT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT

'(Center Table)'

sel BIT Results
N1 Active CBM Bit Results

√No Xs

22. VERIFY CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in "485 Bus Used" telemetry field.

Node 1 Active CBM Display
'N1 Zen'

√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0
If any Bolt or Latch Posn ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0

23. DEACTIVATE FWD CBM PRIMARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Deactive

cmd CBM State to Deactivate N1 Fwd Execute

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode = DEAC

24. ACTIVATE FORWARD CBM SECONDARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Active

cmd CBM State to Active N1 Fwd Master 2 **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - ACTV
√N1 Fwd State - SEC
√N1 Fwd Comm Error - No X

sel BIT results

N1 Active CBM Bit Results

√No Xs

25. SET CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in "485 Bus Used" telemetry field.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero Bus X **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT

26. VERIFY RS-485 COMM STATUS

N1 Active CBM Display
'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
If any Bolt or Latch Cmd Status - MSBD

'(Center Table)'

sel Command/Procedures
sel Other Commands
sel BIT Commands

CBM Bit Commands

cmd CBM Act Bit Active CBM All Ctrlr **Execute**

N1 Active CBM Display
'(CBM Graphic)'

√Conf Request - BIT

'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Confirm/Nonconfirm

CBM Confirm Nonconfirm

cmd CBM Confirmation Cmd **Execute**

N1 Active CBM Display
'(Center Table)'

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - BIT
√Latch 1-1 Cmd Code - BIT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT

'(Center Table)'

sel BIT Results
N1 Active CBM Bit Results

√No Xs

27. VERIFY CONTROLLER POSITIONS ZERO

NOTE
Set All Posns Zero command should be issued to use currently active RS-485 bus channel (A or B). Active channel is indicated in “485 Bus Used” telemetry field.

Node 1 Active CBM Display
‘N1 Zen’

√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0
If any Bolt or Latch Posn ≠ 0

N1 Active CBM Display
‘(Center Table)’

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set All Posns Zero BusX **Execute**

N1 Active CBM Display
‘(Center Table)’

√Master Cmd status - CPLT
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD

‘N1 Zen’

√Bolt Cmd Stat (sixteen) - CPLT
√Latch Cmd Stat (four) - CPLT
√Bolt Pos (sixteen) = 0
√Latch Pos (four) = 0

28. DEACTIVATE FWD CBM SECONDARY MASTER CONTROLLER

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel State to Active/Deactive

CBM State to Deactive

cmd CBM State to Deactivate N1 Fwd **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Fwd Mode - DEAC

29. OPEN SECONDARY RPCs

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Fwd CBM RPC Commands

CBM Forward CBM RPC Commands

sel [X] and [Y] values [X] = 2 3 14 15
[Y] = 1 2 3 4

cmd RPCM N14B A RPC [X] CBM N1 Fwd Sec [Y] Op **Execute**

N1 Active CBM Display
'N1 Fwd CBM Data'

√RPCM N14B A RPC [X] Cntr Asy [Y] - Op

Repeat

HATCH MECHANISM MALFUNCTION

OBJECTIVE:
Identify failed hatch mechanism.

LOCATION:
Installed: U.S. Common Hatch Rib side
Stowed: None

DURATION:
30 minutes

TOOLS REQUIRED:
None

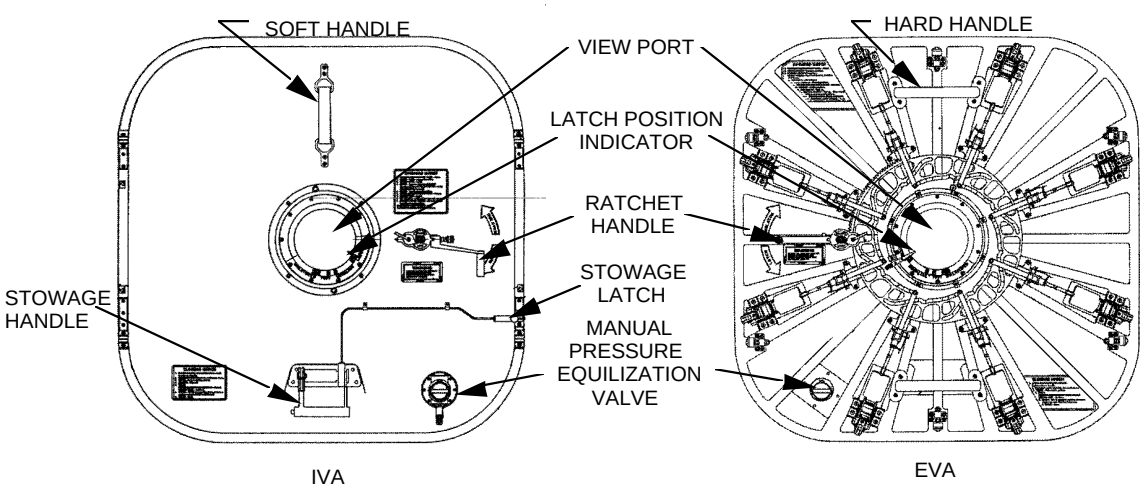


Figure 1.- Dome/Rib.

WARNING

To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches are open.

REMOVE

1. Close, but do not place Hatch against bulkhead.

2. Check Hatch for obvious bent or broken parts.

3. If no defect found
   Continue with procedure

   If defect found
   Use appropriate maintenance procedure

NOTE
The next steps are to exercise hatch mechanism while attempting to identify failed ORU.

4. Cycle hatch crank back and forth to attempt to identify failed ORU.

5. If unable to identify failed ORU
   | Continue with procedure
   |
   If able to identify failed ORU
   Use appropriate maintenance procedure

6. Disconnect tension rods (eight) from drive mechanism by removing pip pins.

7. Secure loose ends of tension rods (eight) away from drive mechanism. Use tape to secure loose ends.

8. Cycle crank.

9. If crank does not bind, jam or have any other defect
   | Continue procedure
   |
   If crank does bind, jam, or have any other defect
   Attempt to identify if pinion gear or drive mechanism failed

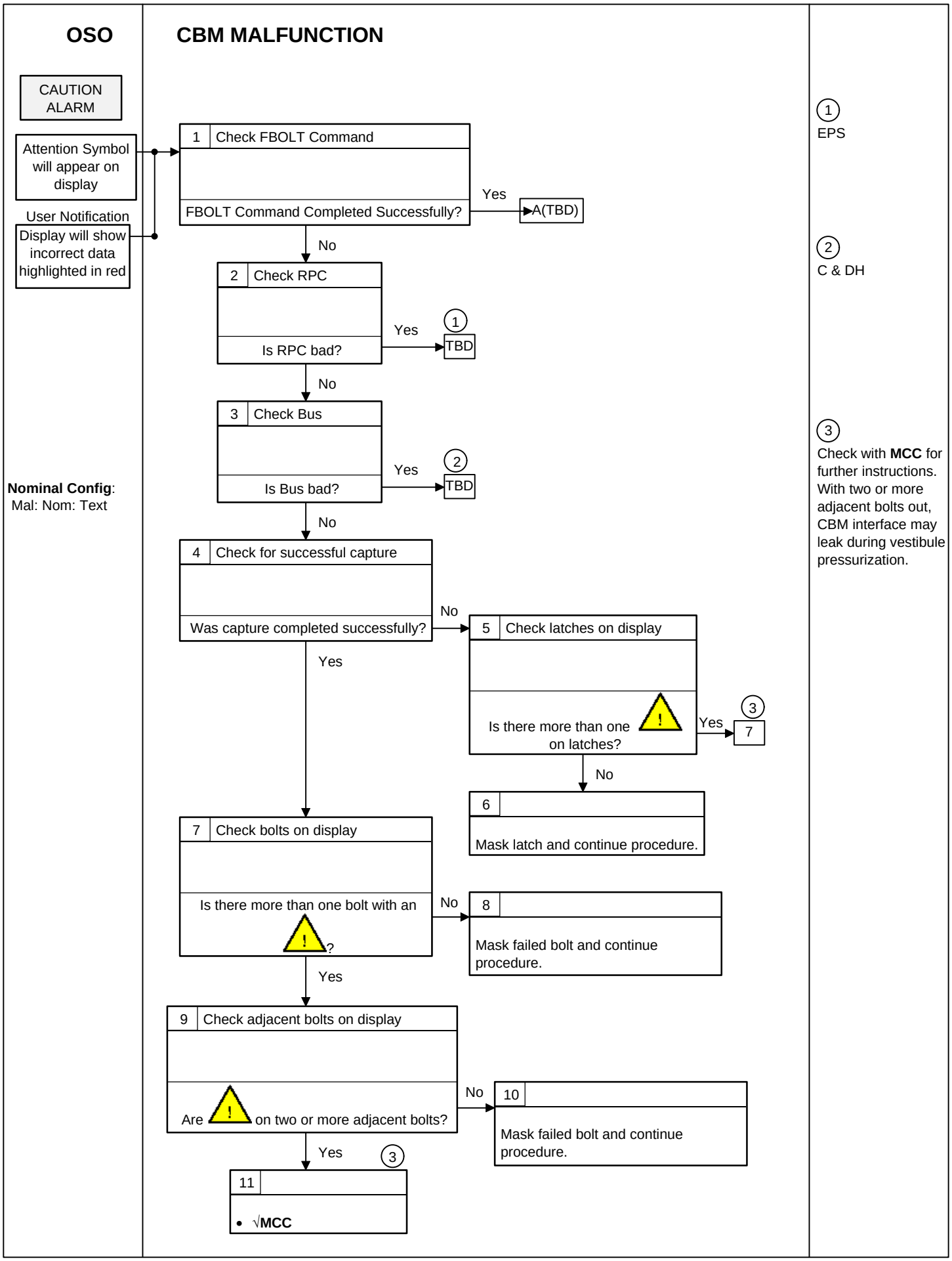
10. If pinion gear is failed
    | Remove and replace Hatch
    |
    If pinion gear is not failed
    Remove and replace hatch drive mechanism

NOTE
After each installation of tension rod, the hatch crank is cycled to determine if newly installed tension rod/latch assembly is defective.

11. Install tension rods one at a time (eight), cycle hatch crank after each installation to determine if it is failed.

12. If failed tension rod/latch assembly determined, label failed tension rod/latch assembly.

13. Remove, repair, replace failed tension rod/latch assembly.


OSO
CBM MALFUNCTION
CAUTION ALARM
Attention Symbol will appear on display
User Notification
Display will show incorrect data highlighted in red
Nominal Config:
Mal: Nom: Text
1 Check FBOLT Command
FBOLT Command Completed Successfully?
Yes
A(TBD)
No
2 Check RPC
Is RPC bad?
Yes
1
TBD
No
3 Check Bus
Is Bus bad?
Yes
2
TBD
No
4 Check for successful capture
Was capture completed successfully?
No
5 Check latches on display
Is there more than one on latches?
Yes
3
7
No
6
Mask latch and continue procedure.
Yes
7 Check bolts on display
Is there more than one bolt with an ?
No
8
Mask failed bolt and continue procedure.
Yes
9 Check adjacent bolts on display
Are on two or more adjacent bolts?
No
10
Mask failed bolt and continue procedure.
Yes
3
11
• √MCC
1
EPS
2
C & DH
3
Check with MCC for further instructions. With two or more adjacent bolts out, CBM interface may leak during vestibule pressurization.